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# **English**

## **Opens Many Doors**

Англійський науковий текст:  
розуміння, інтерпретація, переклад

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**Калюжна В. В.**

**К17** English opens many doors : англійський науковий текст: розуміння, інтерпретація, переклад: навч. посіб. / В. В. Калюжна, О. Й. Букреева. — К. : Ін-т сучас. підруч., 2010. — 272 с.

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Метою посібника є розвиток навичок сприйняття тексту як єдиного логічного цілого, розуміння та інтерпретації найбільш частотних і складних синтаксичних структур наукової прози: дієприкметникових, інфінітивних та герундіальних зворотів, пасивних і емфатичних конструкцій.

Нетрадиційний підхід до розгляду граматичного матеріалу значною мірою полегшує розуміння складних граматичних явищ, що дозволяє працювати однаково успішно з текстами різноманітної тематики. Пропонується також практичний матеріал із складання анотації/реферату наукової статті.

Для мовних вузів, факультетів природничих наук, інформатики, перекладачів-початківців, аспірантів, наукових працівників, а також для учнів 10–12 класів загальноосвітніх навчальних закладів (профільний рівень).

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# ПЕРЕДМОВА

У наш час інформаційного вибуху наукові працівники, студенти змушені читати величезну кількість текстового матеріалу рідною та іноземними мовами. Виникла гостра необхідність у створенні методик, які дозволяють полегшити сприйняття інформації, сприяють повному її розумінню.

В основу цього посібника покладено тезу лінгвістики тексту про те, що текст являє собою комунікативний акт, у якому зафіксовано певну інформацію і який є синтактико-смісловою єдністю. Синтаксична структура тексту виражається через формальні розрізнявальні ознаки, що лежать, так би мовити, на поверхні тексту. Сміслова сторона тексту — його зміст, закладена в ньому інформація — розкривається на більш просунутих етапах роботи з текстом як результат виявлення глибинного значення поверхневих синтаксичних структур.

Метою цього посібника є навчання студентів та аспірантів читання й розуміння наукового тексту. Оскільки основним навчальним матеріалом у процесі вивчення іноземних мов є письмовий текст, здійснено спробу внести в роботу з текстом ряд положень лінгвістики тексту.

Наш досвід викладання показує, що слухачі стикаються в основному з труднощами на двох рівнях отримання інформації з тексту: на рівні речення і на рівні розуміння тексту в цілому. Підхід, що використовується тут, поєднує бачення та розуміння структури англійського речення на першому етапі й отримання найбільш повної інформації з тексту — на наступному, з особливим наголосом на логіко-сміслові зв'язки між частинами тексту.

Посібник побудовано на загальнонауковому матеріалі. Такий вибір дозволяє викладачеві в процесі аналізу тексту корегувати та направляти думку слухачів, допомагати глибше сприймати зміст, розкривати всі тонкощі смислового аспекту, вдаючись до екстралінгвістичної науково-сміислової інтерпретації.

Посібник складається з трьох частин. *Перша частина* — робота над реченням — включає теоретичний матеріал (розділ 1) і тренувальні вправи (розділ 2). *Друга частина* — це робота з текстами. *Третя частина* — складання анотації (резюме) наукової статті.

Принцип, який покладено в основу подання теоретичного матеріалу, базується на функціонально-синтаксичному підході, тобто розгляданні граматичних форм і частин мови з огляду на їх синтаксичний статус у реченні. Відомо, що в англійській мові найскладнішими є безособові форми дієслів, яких чимало у наукових текстах. Вони утворюють звороти, що потенційно є еквівалентами підрядних речень в англійській та українській мовах. Автори посібника намагалися нетрадиційно подати матеріал, присвячений безособовим формам дієслова, саме з огляду на їх функції як члена речення, як синтаксичної одиниці, а не як частини мови, як це робиться у багатьох посібниках з граматики. На наш погляд, такий підхід значно спрощує сприйняття структури тексту, веде до розуміння принципу побудови всього речення, тобто до вироблення найскладнішої та важливої навички, що зумовлює у подальшому правильну інтерпретацію всього тексту.

Складний додаток і складний підмет трактуються на основі розподілу інформації на основну та другорядну. Інакше тлумачаться і безособові конструкції із займенником *it* і конструкція *there is / there are*, у якій перший елемент передую наступній думці. Подібний підхід полегшує вироблення вміння помічати смислові зв'язки не лише у реченні, але й у зв'язному тексті.

Важливу роль у розумінні смислової сторони того, що читається, відіграє правильне сприйняття модальності тексту. У посібнику зроблено спробу нетрадиційним шляхом представити специфіку модальних релятивів, що виражають різний ступінь категоричності вислову.

У посібнику немає складних наукових описів і трактовок граматичних явищ. При аналізі конструкцій використовуються синонімічні трансформації, в результаті яких складні не відомі учням структури замінюються на відомі, прості, схожі конструкції в українській мові.

Під час передачі українською мовою структур часто виникають труднощі у підборі еквіваленту. У посібнику подаються деякі практичні рекомендації з перекладу, оскільки навчальний переклад, тісно пов'язаний з аналізом тексту, є одним із важливих факторів у навчанні читання та контролю розуміння прочитаного.

Структурні схеми речень і словосполучень доповнені списками лексичних одиниць, що беруть участь у формуванні різних членів речення. Це, звичайно, розширює науковий вокабуляр учнів, сприяє формуванню у них навичок автоматичного відтворення схожих конструкцій.

Тренувальні вправи (розділ 2, частина 1) спрямовані на розвиток творчого підходу до аналізу граматичних явищ. У більшості вправ на заміну, трансформацію, підстановку, відновлення повного речення за його фрагментами, складання структурних схем речення тощо відпрацьовуються навички розпізнавання структури речення, встановлення зв'язків між його елементами.

Зрозуміло, що для забезпечення «зрілого» читання неможливо обмежитися структурно-вербальним рівнем. Це лише перший етап. Другий етап у навчанні читання наукової літератури — сприйняття змісту зв'язного тексту. Як перехідний етап від речення до більшого відрізка інформації — тексту — пропонується робота з мікротекстами в «On Your Own». Завдання цього підрозділу — розвинути в учнях уміння розпізнавати граматичні явища, про які йшлося у частині 1, у більшому оточенні, ніж речення, що часто викликає певні труднощі, оскільки явище ніби заховане у загальному потоці інформації.

Завдання до мікротекстів у «On Your Own» спрямовані на розробку репродуктивних навичок, активізацію граматичних явищ, що вивчаються. Не зрозумівши та не впізнавши конструкцію (форму) у реченні тексту, учень не зуміє повно й чітко відповісти на запитання чи виконати інше завдання, яке запропоновано після тексту. Запитання поставлено не лише для контролю загального розуміння змісту, а й для того, щоб через розпізнання конкретного граматичного явища учень дійшов до абсолютно адекватного розуміння думки автора. Навички відтворення граматичної структури дуже важливі у розвитку вміння написати статтю чи тези до неї іноземною мовою. Це вміння розвивається у заключній частині посібника.

Ще одним важливим моментом «On Your Own» є те, що тут уже починається робота над виявленням логіко-сміслових, а не лише структурних зв'язків тексту. У «Now Try This» подані завдання на встановлення причинно-наслідкових відношень, порівняння, протиставлення, визначення основної думки, враховуючи маркери цих зв'язків.

Таким чином, частина 1 дозволяє перейти до наступного етапу — «зрілого» читання.

Основний вид навчання — робота з текстом, його смисловий аналіз в цілому, а також його складових елементів. Тому в 2 частині особливу увагу зосереджено на виявленні текстуальних зв'язків — синтаксичних та логіко-сміслових, а також засобів їх вираження. До них належать: узагальнюючі слова, що розкривають своє значення в інших реченнях, передуючі та наступні елементи тексту, що корелюють зі словами-замісниками, вказівні та присвійні займенники у підрядних реченнях, лексичні та граматичні повтори, еліптичні конструкції тощо. Відсутність належної уваги до цього аспекту

призводить до великої кількості помилок, пов'язаних із службовою лексикою.

Оскільки ізольоване речення у тексті ніколи не дає уявлення про напрям думки тексту в цілому, автори пропонують післятекстові завдання, які дозволяють розвинути вміння сприймати текст як цілісну одиницю інформації через виявлення його логіко-сміслових зв'язків (порівняння, протиставлення, причина, наслідок, основна думка, ілюстративна частина тощо). У розділі 1 цієї частини відпрацьовуються навички встановлення таких зв'язків, їх розпізнавання. Після короткого теоретичного вступу пропонуються вправи, які закріплюють ці навички на мікротекстах.

Розділ 2 інтегрує всі попередні види роботи, що ведуть до розуміння змісту. Завдання мають творчу спрямованість, пошуковий характер. У результаті їх виконання виявляється глибинне значення синтаксичних структур з урахуванням їх екстралінгвістичних факторів.

Матеріал розділу 2 сприяє розвитку вмінь будувати монологічне мовлення. Викладач може організувати дискусію на тему, що пропонується у тексті. Це буде сприяти розвитку вмінь вести бесіду (діалогічне мовлення).

У третій частині посібника пропонується практичний матеріал для складання анотації (резюме) наукової статті. Структурні кліше, найбільш уживані лексичні одиниці та вправи для відпрацювання смислових фрагментів під час написання анотації дозволяють розвинути це вміння. На завершення вміщено тексти для перекладу та складання резюме (анотації) наукової статті.

Посібник може бути використаний в основному курсі англійської мови, при читанні спецкурсу з інтерпретації тексту (передперекладацька практика), як спецкурс з наукового перекладу (факультети романо-германської філології, факультети природничих наук, факультет перекладу). Рекомендується також для старших класів шкіл, гімназій і ліцеїв із поглибленим вивченням англійської мови.

# Частина I

## ГРАМАТИКА НАУКОВОГО ТЕКСТУ

### 1. РЕЧЕННЯ

Англійське речення має чітко визначений порядок слів — підмет, присудок, додаток. Центром речення є дієслово-присудок (Пр). Це дієслово пов'язує підмет (П) з інформацією про нього або з додатком (Д).

#### СХЕМА ПРОСТОГО РОЗПОВІДНОГО РЕЧЕННЯ

П	Пр	Д
<i>Peter</i>	<i>is a researcher</i>	—
<i>He</i>	<i>seems bright</i>	—
<i>He</i>	<i>studies</i>	<i>physics</i>
<i>He</i>	<i>likes</i>	<i>sciences</i>
<i>He</i>	<i>writes</i>	<i>articles</i>

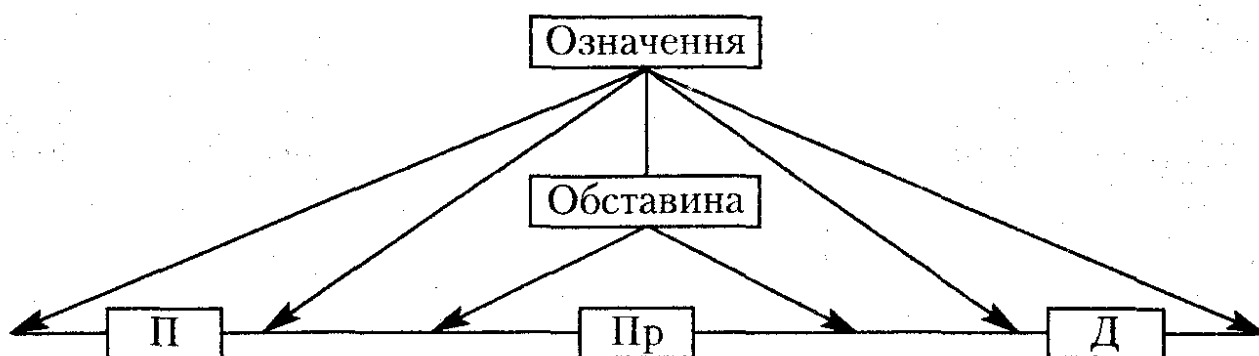
Підмет, як і додаток, може бути виражений не лише іменником (займенником тощо), але й реченням (clause), наприклад:

П	Пр	Д
1. <i>That we need more practice in English</i>	<i>means</i>	<i>that our skills in the language are still poor.</i>
2. <i>How the method will work</i>	<i>depends</i>	<i>on whether the engineer is computer competent.</i>
3. <i>That she failed to conduct the test</i>	<i>surprised</i>	<i>her colleagues.</i>
4. <i>Whatever you do in your research</i>	<i>will be of service</i>	<i>to science.</i>

Обставини різного виду (причини, часу, умови тощо) також, поряд із іншими способами, можуть бути представлені реченням. У таких випадках усе речення стає складним і складається з головного (main sentence) та підрядного (clause).

Означення уточнює підмет/додаток і може стояти як зліва, так і справа від слова, що воно означає.

### СХЕМА РОЗГОРНУТОГО РОЗПОВІДНОГО РЕЧЕННЯ



Підрядне речення, в залежності від логіко-сміслових відносин, які воно виражає (причина, умова, час, мета тощо), вводиться певним сполучником, який в свою чергу є показником (маркером) цих відносин. За маркерами можна прослідкувати логічні зв'язки між частинами складного речення. Зазначимо, що в науковому тексті підрядні речення часто згорнуті (перевтілені) у звороти *Ving*, *Ved<sub>3</sub>*, *Vinf*.

Складне речення містить не лише залежні елементи (підрядні речення складнопідрядного речення). Воно може складатися з відносно незалежних частин (складносурядне речення). Особливий інтерес тут представляють речення супроводжуючого, уточнюючого та узагальнюючого характеру. Між цими частинами складного речення стоїть, як правило, чи крапка з комою/кома, чи сполучники *and*, *so*, *which*.

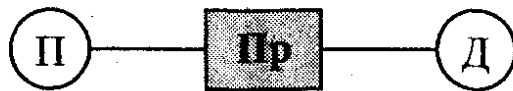
*At the beginning of the 20th century only 10% of the world's population lived in cities;*

*by the year 2002 the number will be close to half of the world's projected 6.3 billion,*

*which means a threat to people's living conditions. (= and it means a threat... / = meaning a threat to people's living conditions.)*

## 2. ПРИСУДОК

### §1. ДІЄСЛОВА *DO, HAVE, BE*. ЧАС АНГЛІЙСЬКОГО ДІЄСЛОВА



Ознаками присудка в англійському реченні є:

- дієслово в одній з форм, що виражають число, особу, час, стан, аспект;
- модальне дієслово з інфінітивом основного дієслова — дієслово-зв'язка *to be (to seem, to appear, to go, to become, to grow, to turn, to look, to chance, to happen, to feel)* з іменником або прикметником (чи їх еквівалентами — *Ving/Ved<sub>3</sub>/Vinf*).

Дієслова *to do, to have, to be* — багатозначні та виконують нижченаведені функції.

#### TO DO

а) смислове дієслово

*They do physics.* — Вони займаються фізикою.

б) допоміжне дієслово для створення питання та заперечення у Present Indefinite і Past Indefinite

*Do they make any progress in the field?* —

Чи є у них які-небудь досягнення у цій галузі?

*Yes, they do.* — Так.

*In the last century man did not fully realise his impact on nature.*

— У минулому столітті людина повністю не усвідомлювала свій вплив на природу.

в) заміник смислового дієслова

*They investigate into the problem of heredity. So does this laboratory.* — Вони займаються проблемою спадковості. І ця лабораторія також.

г) дієслово-підсилювач

*Nowadays man does realise what effect he makes on his environment.* — Сьогодні людина дійсно усвідомлює те, як вона впливає на оточуюче її середовище.

## TO HAVE

а) смислове дієслово

*The research team **has** all necessary equipment for the experiment.*  
— Дослідницька група має все необхідне обладнання для проведення експерименту.

б) модальне дієслово

*They **had** to put off the experiment through lack of the necessary equipment.* — Вони **були вимушені** відкласти експеримент через відсутність необхідного обладнання..

в) допоміжне дієслово

*A new hypothesis **has** recently been put forward.* — Нещодавно було висунуто нову гіпотезу.

г) каузативне дієслово

*He **had** the Committee agree to the project.* — Йому вдалося переконати комітет погодитися з проектом.

## TO BE

а) смислове дієслово

*They **are** on the right way in their research.* — Вони обрали правильну лінію дослідження.

б) допоміжне дієслово

*Nuclear energy is considered essential for man in future.* — Вважається, що ядерна енергія має велике значення для майбутнього людства.

в) дієслово-зв'язка

*He **is** a researcher.* — Він — учений-дослідник.

*The evidence **is** reliable.* — Ці данні надійні.

г) модальне дієслово

*They **are** to report the results at a laboratory seminar.* — Вони мають доповісти про свої наукові результати на семінарі.

**Примітка.** Варто розрізняти два значення сполучення *to be* + інфінітив:

а) “може”, “буде”, “повинен” (вибір зумовлюється контекстом)

*To get accurate data one is to employ modern technique.*

Для отримання точних даних необхідно використовувати сучасні методи.

В умовних підрядних реченнях модальний присудок *to be* + інфінітив зазвичай вказує на намір, бажання виконати дію, виражену інфінітивом.



*If man is to survive he should stop the environmental damage immediately. — Якщо людство хоче вижити, воно мусить негайно припинити руйнування довкілля.*

б) “є”, “полягає в тому, що...”

*The aim of the chapter is to give a review of the state of the art in this field of science. — Мета цієї глави полягає в тому, щоб дати огляд сучасного стану науки у цій галузі.*

Щодо використання часу англійського дієслова, треба зауважити, що цей аспект викликає певні труднощі при складанні анотації (резюме) наукової статті. Тут існує достатньо чітка закріпленість використання граматичного часу за відповідним структурним розділом анотації. Загалом треба мати на увазі наступне. Вступна частина, в якій стисло розповідається передісторія проблеми, пишеться у Present Perfect — E. g.: *The problem of... has been investigated by a number of researchers*. Розповідаючи про отримані результати, слід використовувати Present Perfect (passive) — E. g.: *Evidence has been obtained that...* — *Отримано дані, які свідчать про те, що...*

Зміст статті передається у Simple Present. Simple Past використовується для більш докладного опису (хід експерименту, посилення на попередні дослідження, більш детальні коментарі). Питання методології відображаються у Simple Past. Взагалі треба розуміти, що використаний час говорить про позицію автора, про його ставлення до інформації, що повідомляється: Present Perfect — автор підкреслює її актуальність, зв'язок із сучасним моментом; Simple Past — автор вважає її другорядною, такою, що належить історії. Більш докладно це питання розглядається в останньому розділі посібника.

## § 2. ПАСИВНІ КОНСТРУКЦІЇ

В англійському пасивному реченні формальний підмет фактично є логічним додатком дієслова-присудка.

E. g.: *The research team has suggested a new hypothesis. — A new hypothesis has been suggested (by the research team).* (пропонувати кого/що — *a new hypothesis* — *нову гіпотезу*). Тому, розпочи-

наючи аналіз, а потім переклад пасивних речень, корисно встановлювати цей зв'язок.

*E. g.: The problem was approached from another perspective.* To approach the problem — підходити (до кого/чого) до вирішення проблеми. *До вирішення проблеми підішли з іншого боку.*

Запам'ятайте дієслова та сполучення, які найчастіше трапляються у мові наукової прози при утворенні пасивних речень:

1. allow	— дозволяти
ask	— просити, питати
assist, help	— допомагати
avoid	— уникати
discuss	— обговорювати
give	— давати
inform	— повідомляти
neglect	— нехтувати
precede	— передувати
promise	— обіцяти
recommend	— рекомендувати
show	— показувати, демонструвати

**Примітка.** При перекладі речень, в яких присудок виражено одним із наведених дієслів у пасиві, підмет в українській мові використовується в непрямому відмінку (тобто в будь-якому, крім називного).

*They were given up-to-date equipment.* (давати кому/чому — їм). — *Їм встановили сучасне обладнання.*

2. agree upon	— домовлятися про
deal with	— мати справу з
do away with	— відмовитися від, покінчити з
insist on	— наполягати на
object to	— бути проти
refer to	— відсилати до, посилатися на
to refer to ... as	— називати
rely on	— покладатися на
think of (about)	— думати про
to think of ... as	— вважати

**Примітка.** Вищенаведеним дієсловам в українській мові відповідають дієслова з прийменником. Переклад пасивного речення з такими дієсловами рекомендується починати з прийменника.

*The discovery was referred to in a number of publications* (посилатися на кого/що — на це відкриття). — *На це відкриття посилалися у ряді робіт.*

- |                |                             |
|----------------|-----------------------------|
| 3. account for | — пояснювати                |
| allow for      | — враховувати               |
| bring about    | — здійснювати, обумовлювати |
| comment on     | — тлумачити, коментувати    |
| touch on       | — зачіпати, торкатися       |

Зверніть увагу на те, що логічну паузу при читанні пасивних речень з даними дієсловами слід робити після прийменника, адже його додаток не знаходиться далі в реченні (як це відбувається в активному способі), а вже стоїть на його початку.

**Примітка.** Даним англійським дієсловам, що приєднують додаток за допомогою прийменника, в українській мові відповідають дієслова, що приєднують додаток без прийменника.

*The disagreement can be accounted for by the different methods used in the analysis.* (пояснювати кого/що — таку невідповідність). — *Таку невідповідність можна пояснити застосуванням інших методів при аналізі.*

Тут залишається в силі зауваження (п. 3) про логічну паузу при читанні.

- |                     |  |
|---------------------|--|
| 4. affect/influence | — впливати на                            |
| answer              | — відповідати на                         |
| approach            | — підходити до                           |
| attend              | — бути присутнім на                      |
| *follow             | — йти за, використовувати, слідкувати за |
| join                | — приєднуватися до                       |
| watch               | — слідкувати за                          |

**Примітка.** Данним англійським дієсловам в українській мові відповідають дієслова з прийменниками.

*The accuracy of the calculations was influenced by some factors* (впливати на кого/що — на точність). — *На точність розрахунків вплинули деякі фактори.*

Дієслово **follow** має кілька значень:

а) йти (щось за чимось)

*The hypothesis is followed by the attempts to prove it.* — *За гіпотезою йдуть спроби її довести.*

б) слідкувати (за)

*The movement of the newly discovered star was followed for a year.*

— *За рухом нещодавно відкритої зірки слідкували протягом року.*

в) використовувати, дотримуватись (методу, досвіду тощо)

*The method suggested in the paper is followed by a number of researchers.* — *Метод, запропонований у статті, використовується багатьма дослідниками.*

Рекомендується починати переклад з прийменника, не змінюючи порядку слів англійського речення.

5. pay/give attention to sth.	звертати/приділяти увагу
draw attention to sth	привертати увагу
*make attempt = to attempt to do sth.	намагатися
*make (an) effort to do sth.	старатися
make mention of sth. = to mention sth.	згадувати
make reference to sth. = to refer to sth.	посилатися
make use of sth. = to use sth.	використовувати
make allowance for sth. = to allow for sth.	враховувати
take account of sth. = to take sth into account	враховувати
take advantage of sth.	враховувати, використовувати
take notice of sth. = to note/to notice sth.	звертати увагу, відзначати
to place emphasis on = to make emphasis of sth	наголошувати, підкреслювати

**Примітка.** Для словосполучень, за якими йдуть іменники, а не дієслова, існує дві можливості створення пасивних конструкцій (адже у пасивних реченнях з такими сполученнями є два додатки: один — іменник цього словосполучення, другий — додаток всього речення):

а) підмет англійського речення — іменник даного словосполучення (*attention, attempt, effort, mention, refence, use, etc*), в яких він виступає в ролі додатку:

*Attention is given to the new tendencies in the process.* — *У даному процесі приділяється увага новим тенденціям.*

Зауважимо, що логічна пауза після прийменника не робиться, адже за ним йде його додаток (*the new tendencies*).

б) підмет англійського речення — додаток речення

*New tendencies in the process are given special attention to in the recent publications on the problem.* — В останніх публікаціях з цієї проблеми приділяється особлива увага новим тенденціям у даному процесі.

### Безособові пасивні конструкції

а) Модальні:

*It is to be noted that...* = *It should/must be noted that ...* — Варто (необхідно, слід) зазначити, що...

*It is to be mentioned that...* = *It should/must be mentioned that ...* — Слід згадати, що...

*It is to be anticipated that ...* = *It should/must be anticipated that...* — Слід очікувати, що...

*It is to be remembered that...* = *It should/must be remembered that...* — Варто (необхідно) запам'ятати, що... ;

б) констатуючі:

*It is said that...* — Говорять, що...

*It is believed that...* — Вважають (вважається), що...

*It is considered that...* — Вважається (гадають), що...

**Примітка.** З огляду на зміст висловлення зверніть увагу на роль *it* у безособових конструкціях. Тут *it* передує інформації, що йде далі у реченні (додаткове підрядне речення), а не є заміником інформації, яку подано раніше. Логічним підметом у таких реченнях є додаткове підрядне речення, а *it* виконує лише формальну функцію підмета. На українську мову не перекладається (на відміну від тих випадків, коли заміщає інформацію, яку подано раніше в тексті).

У контексті інформаційної перспективи речення (рух від відомої інформації до нової) при перекладі слід звернути увагу на такі пасивні речення, в котрих підмет стоїть із неозначеним артиклем (або без артикля), за ним йде означальна група та закінчує речення присудок. Неозначений артикль вказує на нову інформацію.

*A new technique facilitating the experiment has been suggested here.* — Тут запропоновано (пропонується) новий метод, який полегшує проведення експерименту.

Речення у перекладі слід починати із присудка, щоб віднести нову інформацію (*a new technique facilitating the experiment*) у кінець, де на неї таким чином падає логічний наголос.

Таке твердження може мати наступний варіант: підмет із неозначеним артиклем (або без артикля), за яким йде пасивний присудок, а вже за ним — означальна група (група означення — підрядне означальне речення, інфінітивний, **Ving-** або **Ved<sub>3</sub>-** звороти). У всіх випадках українське речення слід починати з присудка.

а) *A new mechanism has been proposed that could account for the accuracy of the data obtained.* — Було запропоновано новий механізм, котрий, ймовірно, й пояснює точність отриманих даних.

б) *An idea has been suggested to stimulate the process in the laboratory.* — Було запропоновано ідею про моделювання цього процесу в лабораторних умовах.

в) *Additional information has been obtained stimulating further research.* — Було отримано додаткову інформацію, яка послугувала поштовхом до нових досліджень.

Подібні конструкції використовуються під час написання анотації (резюме) та тез наукової статті (див. частину III).

## § 3. МОДАЛЬНІ ДІЄСЛОВА

Кожне модальне дієслово має два плани значення.

**Перший план:** той, хто говорить, ставиться до дії як можливої, необхідної, ймовірної, бажаної тощо.

**Другий план:** той, хто говорить, висловлює ступінь ймовірності, категоричності, впевненості у тому, що дія відбувається (відбудеться, відбулася).

Порівняйте:

Українська мова	Англійська мова
1-й план: Він <b>мусить (має)</b> отримати вищу освіту, щоб стати фахівцем.	1-й план: <i>An applicant <b>must</b> be an expert in his field, otherwise the firm will turn him down.</i> — Кандидат на це місце <b>мусить</b> бути фахівцем, інакше він не отримає місце на цій фірмі.
2-й план: Він, <b>імовірно (можливо, напевно)</b> , стане фахівцем своєї справи.	2-й план: <i>He <b>must</b> be an expert in his field, his name is widely known today.</i> — <b>Напевно</b> , він є гарним фахівцем у своїй галузі, його ім'я широко відоме.

Залежно від ступеня категоричності висловлювання використовуються модальні дієслова з різним ступенем інтенсивності (2-й план значення): від слабкого ступеня впевненості (ймовірності, категоричності) *might* тощо й до високого (*will, must*).

Для вираження попередньої дії використовуються:

а) форма минулого часу модального дієслова із значенням 1-го плану + інфінітив смислового дієслова.

*Last month they could obtain more accurate evidence, but the technique was inadequate.* — Минулого місяця вони мали змогу отримати точніші дані, проте їхня методика була недосконалою.

**Примітка.** При перекладі визначення часу дії, яка виражена *must, should, could, ought*, здійснюється на основі контексту.

б) модальне дієслово (*might, could, would, should, ought, need*) + перфектний інфінітив.

*The phenomenon, when discovered, should have been properly interpreted by specialists.* — Цьому явищу фахівці мали б дати вірну оцінку відразу після його відкриття.

в) модальне дієслово зі значенням 2-го плану + перфектний інфінітив.

*At that time the phenomenon must have been given wrong interpretation.* — У ті часи дане явище, скоріш за все, тлумачили невірно.

### **Можливі українські еквіваленти англійських модальних дієслів**

**must** — план 1: необхідно, обов'язково, треба, потрібно, слід і т. п.

план 2: звичайно, безумовно, напевно, безперечно, без сумніву і т. п.

**have + toV** — план 1: доводиться, вимушений, потрібно, неміє виходу і т. п.

план 2: напевно, швидше за все і т. п.

**be + toV** — план 1: повинно, має відбутися, намічено, планується, є намір, призначено і т. п.

план 2: буває, можливо, очікується і т. п.

**shall** — план 1: повинно, треба, зобов'язаний і т. п.

*план 2: (рідко)*

**ought + toV** — *план 1: бажано, слід, вважається, рекомендується і т. п.*

*план 2: (рідко)*

**should** — *план 1: бажано, слід, треба, було б добре, добре б і т. п.*

*план 2: цілком імовірно, цілком можливо, слід чекати, не дивно і т. п.*

**may/might** — *план 1: можна, дозволяється, допустимо, не забороняється і т. п. / можна, дозволяється, було б допустимо і т. п.*

*план 2: можливо; може, так, а може, інакше; хто знає і т. п. / все може бути, а раптом, чого не буває, могло бути й так, і це не виключено і т. п.*

**can/could** — *план 1: можливо, здійснено, реально, ніщо не завадить і т. п. / можливо, здійснено, в принципі можливо і т. п.*

*план 2: цілком імовірно, цілком можливо, є підстави очікувати і т. п.*

**will/would** — *план 1: охоче, обов'язково, із задоволенням і т. п. / охоче, обов'язково, хотілось би і т. п.*

*план 2: завжди, незмінно, як правило, звичайно і т. п. / (звичайно) має бути, слід звичайно очікувати, як правило і т. п.*

### **Модальні дієслова в заперечувальній формі**

**must not (mustn't)** — *план 1: категорична заборона, вимога не робити — ні в якому разі не можна, не слід, не потрібно і т. п.*

*план 2: (не буває)*

**do not have + toV, need not** — *план 1: відсутність необхідності, необов'язковості — немає потреби, не потрібно, необов'язково і т. п.*

*план 2: (не буває)*

**be not** — *план 1: домовленість не робити — не треба, не потрібно, не будемо і т. п.*

*план 2: негативний прогноз — не + теперішній / майбутній час дієслова.*



**shall not (shan't)** — *план 1: вимога не робити* — не повинні, не сміють, не будуть і т. п.

*план 2: (не буває)*

**ought not, should not** — *план 1: рекомендація не робити* — не слід, не бажано і т. п.

*план 2: (не буває)*

**may not, might not** — *план 1: відмова в дозволі* — не можна, не дозволено, неприпустимо і т. п.

*план 2: вірогідність того, що дія не відбувається* — можливо не ...

**cannot (can't), could not (couldn't)** — *план 1: неможливість/нездійсненність дії* — неможливо, не можна, не може і т. п.

*план 2: невірогідність дії* — не може бути, щоб...

**will not (won't), would not (wouldn't)** — *план 1: наполегливе небажання, відмова діяти, функціонувати; обіцянка не робити* — ніяк не ..., в жодному випадку не ... і т. п.

*план 2: невірогідність дії* — авжеж не ..., звичайно, не ..., ну як може бути інакше...

## § 4. УМОВНИЙ СПОСІБ

У мові наукової прози умовний спосіб застосовується для визначення дії, яку той, хто говорить, сприймає як можливу або бажану.

Умовний спосіб використовується в наступних випадках:

а) у підрядних додаткових реченнях, якщо присудок головного речення — дієслово (дієслівне сполучення), яке виражає припущення, бажання, наказ, прохання, емоційний стан:

suggest, suppose	— припускати
recommend, advise	— радити
demand, require	— вимагати
propose, suggest	— пропонувати
insist	— наполягати
urge	— спонукати
request	— просити
order	— наказувати
desire, wish	— бажати, хотіти

to be afraid	— побоюватися
to be sorry	— жалкувати, шкодувати
to be surprised	— дивуватися
to fear	— боятися, побоюватися

*An idea was suggested that the researcher **(should) continue** the investigations.* — Було висловлено пропозицію, щоб дослідник **продовжив** свою наукову роботу.

*The experiment requires that the researcher **(should) be** highly experienced in this kind of work.* — Для виконання цього експерименту потрібно, щоб дослідник мав високу кваліфікацію у проведенні такого роду робіт.

*The professor insists/insisted that prehistoric men **should have inhabited** the place.* — Професор наполягає(в) на думці про те, що на даній території мешкали первісні люди.

*The author recommends that the reader **(should) refer** to the previous publications on the subject.* — Автор рекомендує читачеві звернутися до попередніх публікацій на цю тему.

б) у підрядних додаткових реченнях після головного речення, що виражене безособовим зворотом, наприклад:

advisable — рекомендується  
 desirable — бажано  
 essential — суттєво  
 important — важливо  
 necessary — необхідно  
 urgent — терміново, необхідно  
 annoying — прикро

**It is** extraordinary — незвичайно, вражаюче  
 inevitable — неминуче  
 natural — природно  
 possible — можливо  
 probable, likely — ймовірно  
 strange — чудно, дивно, дивовижно  
 surprising — дивно, дивовижно

*It is desirable that the technique **be suitable/ should be suitable** for various applications.* — Бажано, щоб цю методику можна було застосовувати у різноманітних цілях.

*It is quite natural that at first original ideas (should) appeal to the minds of a minority.* — Цілком природньо, що оригінальні ідеї сприймаються спочатку меншістю.

в) у підрядних реченнях після сполучників:

in order that, that	— щоб
so that	— так, щоб
lest	— щоб... не
as if/as though	— нібито, ніби

*Precautions should be taken lest an accident happen/should happen.* — Слід взяти запобіжних заходів, щоб не допустити нещасного випадка.

*Further investigations were made in order that the new approach be validated/should be validated.* — Проводили подальші дослідження, щоб обґрунтувати новий підхід.

*He looks as if he had a great deal of experience and knowledge in his field.* — Виглядає, ніби він дуже досвідчена та обізнана людина у своїй галузі.

### 3. ПІДМЕТ



Найчастіше підмет може бути виражений:

1. Іменником, займенником, числівником, **Ving**, інфінітивом.

*The assumption was accepted as the basis of the experiment.* — Це припущення/вихідне положення було прийнято за основу експерименту.

*It is proved by experiment.* — Це підтверджується експериментально.

*To experiment is important in any applied research.* — Експеримент/експериментування є важливим у будь-якій прикладній науці.

*Experimenting helps to prove the hypothesis.* — Експеримент/експериментування допомагає довести гіпотезу.

*Five is an odd number.* — П'ять — непарне число.

2. Підрядним реченням, що починається із сполучників:

— *that (the fact that/the idea that)*

*That the problem has several solutions complicates the situation.*

— Ситуація ускладнюється тим, що задача має кілька шляхів розв'язання. **Те, що задача має кілька шляхів розв'язання, ускладнює ситуацію.**

*The idea/the fact that there was a mistake in the calculation was supported by the experimenter.* — Експериментатор підтвердив припущення, що у розрахунках було зроблено помилку (**Припущення про те, що у розрахунках було зроблено помилку, було підтверджено експериментатором**);

— *why, what, whether, who, etc.*

*Why the water has become polluted is a matter of grave concern.*

— Велике занепокоєння викликають причини забруднення води. (**Те, чому/через що відбулося забруднення води, викликає особливе занепокоєння**).

*What should be done first will become clear later on.* — Пізніше з'ясується/стане зрозумілим, чим слід зайнятися в першу чергу. (**Те, чим слід зайнятися в першу чергу, з'ясується/стане зрозумілим пізніше**).

*Who is engaged in the research is not known yet.* — Доки не відомо, хто бере участь у цих наукових дослідженнях.

*Whether the research can be applied should be clear at the beginning.* — З самого початку має бути зрозумілим, чи мають отримані результати практичну цінність. (**Чи можна застосувати результати на практиці, має бути зрозумілим з самого початку**).

Підрядне речення можна поставити у кінець і виразити його через неозначений займенник *it*.

*It is vital to understand now what should be done first.* — Сьогодні конче необхідно зрозуміти, що слід зробити у першу чергу.

*It is not known yet who is engaged in the research.* — Досі невідомо, хто займається цим дослідженням.

*It is possible to say now whether the research is capable of practical application.* — Сьогодні вже можна сказати, чи має ця наукова робота практичне значення.

3. *Ving*-зворотом:

а) без суб'єкта

*Reading aloud a new text is not easy.*

Нелегко читати вголос новий текст.

б) зі суб'єктом. В даному випадку Ving-зворот є згорнутим підрядним реченням.

*The student's (his) reading his notes before the lecture helps him to understand the subject better. — That the student reads his notes before the lecture helps him... — Те, що студент перед лекцією проглядає свій конспект, допомагає йому краще зрозуміти предмет.*

**Примітка.** Суб'єкт Ving-звороту може бити виражений іменником у присвійному/загальному відмінку, або присвійним займенником, тобто формулою *N's/his + Ving*.

4. Інфінітивним зворотом:

а) без суб'єкта

*To read aloud a new text is not always necessary. — Не завжди треба читати новий текст уголос.*

б) із суб'єктом, який вводиться **for**. Інфінітивний зворот у цьому випадку є згорнутим підрядним реченням.

*For the strategy to succeed without fresh ideas is doubtful. That the strategy will succeed without fresh ideas is doubtful. — Сумнівно, що ця стратегія буде успішною без нових ідей.*

Для наукового тексту є характерним вживання речень із відстроченим логічним підметом, якому передують **it** або **there** (порівняйте: речення із безособовими конструкціями). Цей спосіб надає можливість логічно виділити підмет. Присудок у таких реченнях може бути виражений:

а) дієсловом розумової діяльності у пасивній формі, наприклад: *it is said, it is known*, тощо;

б) дієсловом-зв'язкою *to be, to seem, to appear* тощо, часто з наступним елементом оціночної модальності: *important, likely, necessary*, наприклад: *there is, there seems to be, it is likely, it seems important*.

*There is a lot of work to do for tomorrow. — Завтра очікується багато роботи.*

*There seem to be some other facts that should have priority in consideration. It seems that there are some other facts... — Наневно, є низка інших факторів, котрі слід розглянути / які мають бути розглянуті в першу чергу.*

*There appear to be a lot of scientists working on the project. — It appears that there are a lot of scientists... — Виявляється, що над проблемою працюють багато вчених.*

*It is said that the method applies in this case. — Говорять, що в даному випадку метод придатний до застосування.*

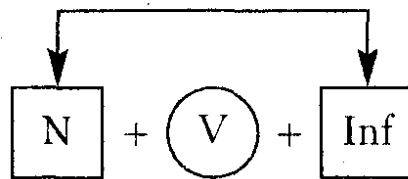
*It is likely that the hypothesis is correct. — Цілком ймовірно, що гіпотеза є вірною.*

**Примітка.** *There* та *it* у цій функції українською мовою не перекладаються.

Речення із формальним *it* можна згорнути:

*It is said that the method applies here. — The method (N) is said (V) to apply (inf.) here. — Говорять, що в даному випадку цей метод можна застосовувати. Цей метод, як вважають, можна застосовувати у цьому випадку.*

Структуру цього згорнутого речення можна виразити формулою:



*N* — підмет підрядного додаткового речення (*the method*);

*V* — присудок головного речення (*is said*);

*Inf* — присудок підрядного додаткового речення, який виражений інфінітивом (*to apply*).

Українською мовою таке речення, зазвичай, перекладають реченням із підрядним додатковим або реченням із вставним елементом (як говорять, як очікується, ймовірно, певно, можливо тощо).

*It is likely that the hypothesis is correct. — The hypothesis is likely to be correct. — Ймовірно, ця гіпотеза є вірною. Ця гіпотеза, ймовірно, є вірною.*

*It can be seen that the scientists are joining their efforts to promote peace. Scientists can be seen (to be) joining their efforts to promote peace. — Як бачимо (можна бачити, що), вчені об'єднують свої зусилля для збереження миру. Вчені, як можна бачити, об'єднують свої зусилля...*

*It seems that the problem has more than one solution. — The problem seems to have more than one solution. — Вихається, що проблема має декілька рішень. Проблема, схоже, має декілька рішень.*

Через редуцію дієслова-зв'язки **to be** замість інфінітива можна вживати *Ving/Adj/Ved<sub>3</sub>/N*, яким часто передує **as**.

*It was considered that the work was done on time and efficiently. — The work was considered (to be) done on time and efficiently. — Вважали (вважалося), що роботу було виконано якісно та вчасно. Роботу, як вважали, виконано якісно та вчасно.*

*It is thought that the subject is hard for general public. — The subject is thought (as) hard for general public. — Вважають, що тема є складною для широкого загалу. Тема, здається, є складною...*

**Примітка.** Для вираження попередньої дії використовують форму перфектного інфінітиву.

*It appears that they (have) made great progress in the research. They appear to have made great progress in the research. — З'ясувалося, що вони багато чого досягли в своїй науковій роботі.*

## **Дієслова та словосполучення, які використовуються у конструкції N + V + Inf**

1. Дієслова на позначення розумової діяльності (вживаються у пасиві).

to assume*	— гадати, думати, уважати
to believe*	— гадати, думати, уважати
to consider*	— гадати, думати, уважати
to estimate	— гадати, думати, уважати, оцінювати
to expect	— уважати, очікувати
to find*	— гадати, знаходити*
to hold*	— вважати, гадати
to know	— знати
to regard	— гадати, уважати, розглядати
to report	— повідомляти, сповіщати
to say	— говорити, казати
to show	— показувати
to state	— стверджувати
to suppose	— уважати

to take*	— гадати, приймати за
to think	— уважати, думати
to understand	— розуміти
to prove	— доводити

2. Дієслова чуттєвого сприймання (вживаються в пасиві):

to hear	— чути
to see, to observe	— уважати, бачити
to feel	— уважати, відчувати

3. Дієслова, що вживаються в активному стані:

to appear	— виявлятися, мабуть, певно
to prove	— виявлятися
to seem	— здаватися, мабуть, певно
to chance	— (випадково) виявитися, з'ясуватися
to happen	— "—
to turn out	— "—
to come out	— "—

4. Словосполучення:

to be likely	— імовірно
to be certain	— без сумніву, безумовно
to be sure	— "—
to be unlikely	— малоімовірно

**Примітка.** Зауважимо, що дієслова, позначені \*, в даній конструкції змінюють своє основне значення. Зверніть увагу на те, що дієслово *to prove* має два різних значення залежно від того, в якому стані стоїть (в активному — *виявлятися*; в пасивному — *доводити*).

## 4. ДОДАТОК



Додаток може бути виражений:

1. іменником

*The experiment proved the hypothesis.* — Експеримент підтвердив гіпотезу.

2. займенником у непрямому відмінку



*The audience listened to **him** with great attention.* — Усі присутні слухали його дуже уважно.

3. числівником

*This number does not divide by **five**.* — Це число не ділиться на 5.

4. додатковим підрядним реченням зі сполучниками: *what, who, whether/if, why, where, when, which, how.*

*Scientists proved **that a nuclear war is a disaster**.* — Учені довели, що ядерна війна — це катастрофа.

*The researcher is not sure yet **whether/if the assumption is valid**.* — Дослідник ще не певен, чи є це припущення справедливим.

*The experts understood **why the situation was changing dramatically**.* — Експерти зрозуміли, чому ситуація так різко змінювалася.

5. інфінітивом або інфінітивним зворотом

а) без суб'єкта

*Scientists **hope to learn more about AIDS in the near future**.* — Вчені сподіваються найближчим часом отримати нові дані про СНІД.

б) із суб'єктом, який виражений іменником/займенником в об'єктному відмінку

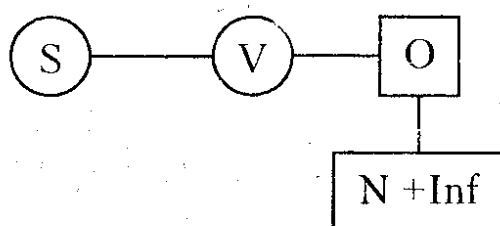
*They expect **people to get more information about this disease**.* — Очікується, що люди отримають більше інформації про це захворювання.

Даний інфінітивний зворот (N+Inf.) являє собою згорнуте підрядне додаткове речення:

*The results showed **the predicted data (N) to agree (Inf.) with experiment**.* — The results showed that the predicted data agreed with experiment.

Результати показали, що теоретичні дані узгоджуються з експериментальними.

Англійське речення, що містить такий інфінітивний зворот, можна представити наступним чином:



S — підмет речення (*the results*)

V — присудок (*showed*)

O — додаток, який складається з:

N — суб'єкт при інфінитиві (*the predicted data*) та Inf (*to agree*)

Через те, що у де-яких випадках дієслово *to be* випускається, цей інфінитивний зворот може мати наступний вигляд:

**S + V + N + (as)Ved<sub>3</sub>/Adj./Ving/N**

*The laboratory considers the ecology problems as timely brought into focus during the discussion* —> *The laboratory considers that the ecology problems were timely brought into focus during the discussion.* — Учені лабораторії вважають, що проблеми екології вчасно посіли провідне місце в дискусії, що ведеться.

*They assume the results as contributing to the discovery of the unknown.* —> *They consider the results to be contributing to the discovery of the unknown.* —> *They assume that the results are contributing...* — Вони вважають, що дані результати допомагають знайти невідоме.

*They take him as a promising scientist.* —> *They take him to be a promising scientist.* —> *They take it that he is a promising scientist.* — Вважають, що це вчений з великим науковим потенціалом.

6. **Ving** або **Ving-** зворотом:

а) без суб'єкта

*They try to avoid making personal critical remarks.* — Вони намагаються не переходити на критику особистостей.

*Dr. Grey insists on discussing another approach.* — Доктор Грей наполягає на тому, щоб було розглянуто альтернативний підхід.

б) із суб'єктом, який може бути виражений іменником (інколи в присвійному відмінку) або займенником (у присвійному чи об'єктному відмінку).

*The success depends on the group completing the experiment on time.* — Успіх залежить від того, чи зможе група вчасно завершити експеримент.

**Ving-**зворот із суб'єктом — це згорнуте підрядне речення, в якому підмет — іменник/займенник зворота (*the group*), присудок — дієслово, що стоїть у звороті у **Ving-**формі(*completing*).

Передування у часі дії, яка виражена **Vinf-** та **Ving-**зворотами, передається перфектом відповідної дієслівної форми.

*We know him to have established this relationship —> We know that he established...* — Ми знаємо, що він **встановив** цю залежність.

*They are responsible for having damaged the equipment.* — Вони **несуть відповідальність/є відповідальними** за те, що обладнання було **зіпсоване**.

### **Дієслова, які вживаються з інфінітивом у функції додатка**

1. Дієслова на позначення розумової діяльності (вживаються в активному стані):

assume	— умовно вважати
believe	— вважати, гадати
consider	— вважати, гадати
estimate	— вважати, оцінювати
expect	— вважати, очікувати
find	— вважати, знаходити
hold	— вважати
know	— знати
prove	— доводити
regard as	— вважати, розглядати
show	— показувати
suppose	— гадати, думати
take	— вважати, приймати (за)
think	— вважати, думати

2. Дієслова чуттєвого сприйняття (після них інфінітив вживається без частки to)

feel	— відчувати
hear	— чути
see	— бачити
watch	— спостерігати
observe	
witness	

3. Дієслова волевиявлення, спонукання

allow	— дозволяти, допускати
enable	— давати можливість, уможливлювати

permit	— давати можливість, уможливлювати, дозволяти
force	— примушувати, змушувати
make*	— примушувати, змушувати (інфінітив вживається без <i>to</i> )
have*	— —"— (інфінітив вживається без <i>to</i> )
get	— —"— (інфінітив вживається з <i>to</i> )
require	— вимагати
want	— хотіти, бажати

**Дієслова, словосполучення, прийменники, після яких використовується *Ving* у функції додатка**

**а) дієслова без прийменника**

avoid	— уникати
continue	— продовжувати
keep	— —"
start	— починати
finish	— закінчувати
prevent	— заважати, перешкоджати
stop	— припиняти
resist	— опиратися
withstand	— протистояти

**б) дієслова з прийменником**

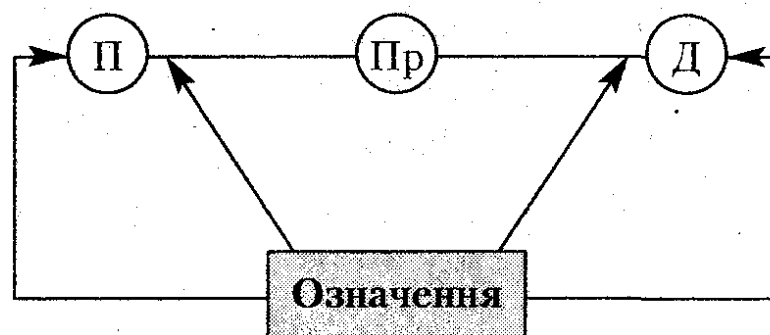
account for	— пояснювати
aid in	— сприяти
be alike in	— бути схожим
be capable of	— бути здатним
depend on	— залежати від
differ in	— відрізнятися за
go on	— продовжувати
give up	— відмовлятися від, кидати
be fond of	— любити, подобатися
insist on	— наполягати на
be interested in	— цікавитися чимось
keep from	— заважати
object to	— заперечувати
rely on	— покладатися на
be responsible for	— пояснювати; бути причиною

result from ,	— виникати з, поставати
result in	— призводити до
be similar in	— бути схожим
succeed in	— удаватися
think of	— думати про

г) прийменники

on account of	— через (те, що)
because of	— " —
apart from	— окрім, окріч, поза
except for	— " —
aside from	— " —
save	— " —
in addition to	— окрім, на додачу
thanks to	— завдяки
due to	— через
owing to	— " —
instead of	— замість
in spite of	— незважаючи на
despite	— " —

## 5. ОЗНАЧЕННЯ



**Ліве означення (див. схему) може бути виражене:**

1. займенником

*His research is promising.* — Його дослідження є перспективними

2. іменником:

а) у присвійному відмінку

*King's power is absolute.* — Король має абсолютну владу./Королева влада є абсолютною.

- в) одним або кількома іменниками  
**Energy problem.** — Енергетична проблема  
**World Health Organization.** — Всесвітня організація хорони здоров'я  
**Science teachers refresher courses.** — Курси підвищення кваліфікації для викладачів природничих наук  
**Waste disposal system.** — Система очисних споруд.  
**Radiation protection problems.** — Проблеми захисту від радіації

**Примітка.** Дана структура може передавати різноманітні типи граматичних відносин:

a) *a research-scientist — the scientist is a researcher* — вчений-дослідник;

*the lady chairperson — the lady is a chairperson* — жінка-головуючий (відносини: суб'єкт — предикат);

b) *food production — X produces food* — виробництво харчових продуктів;

*a chemistry student — the student studies chemistry* — студент-хімік (об'єктні відносини);

c) *copper etching — etching with copper* — обтравлювання міддю;  
*oil painting — painted with oil* — картина, намальована олійними фарбами (перший іменник називає інструмент);

d) *company profits — profits of the company* — прибуток компанії (родовий відмінок);

e) *a glass bottle — a bottle made of glass* — скляна пляшка;  
*a leather chair — a chair made of leather* — шкіряний стілець (перший іменник називає матеріал, з якого виготовлений предмет);

f) *a summer day* — літній день

*the morning sun* — вранішнє сонце (час);

g) *pocket money — money that is in the pocket* — кишенькові гроші;

*a country house — a house that is in the country* — заміський будинок (місце);

h) *a puppet government — a government that acts like a puppet* — маріонетковий уряд;

*tin eyes — the eyes that look like tin* — олов'яні очі (порівняння);

i) *a dinner table — a table for dinner* — обідній стіл;

*a rest house — a house where people rest* — будинок відпочинку (ціль).

### 3. Ving

**The organizing committee** — Організаційний комітет  
 (The committee that organizes/is organizing).



*The work to do (to be done) requires vast knowledge on the subject. —> The work that is to be done (will be done, can be done, must be done) requires vast knowledge on the subject. — Робота, яку необхідно виконати, потребує глибокого знання предмета.*

**Примітка.** Інфінітив у функції означення має модальне значення (може, буде, мусить, має бути, має відбутися) і не відноситься до минулого часу, за винятком випадків, коли у реченні є слова *the first, the second..., the last*. У цьому випадку час, в якому слід перекладати інфінітив, узгоджується із часом присудка речення.

*He was the first to use this technique. —> He was the first who used this technique. — Він першим (був перший, хто) застосував дану методику.*

б) із суб'єктом, що вводиться прийменником *for*

*The distance for the travellers to cover is 5000 kilometers. —> The distance that the travellers are to cover (have to cover/will cover...)*

*Відстань, яку мандрівники мають подолати (подолують), складає 5000 км.*

5. Прийменниковим сполученням: прийменник + іменник/займенник/ підрядне речення/ **Ving**-зворот.

*the reaction under investigation — the reaction that is (being) investigated — реакція, що розглядається;*

*the paper in question — дана стаття;*

*the problem under discussion — the problem that is (being) discussed — проблема, що обговорюється;*

*the conclusion of great importance (significance) — the conclusion that is important — важливий; висновок;*

*the issues of common interest — the issues that are interesting for all — питання, до яких виявляється загальний інтерес.*

Займенник, Ving-зворот та підрядне речення частіше за все вводяться прийменником *of*.

1. *Of* + іменник/займенник.

*The tests of the kind are very costly. — Випробування такого типу вимагають великих витрат.*

*This idea of yours is quite reasonable. — Ваша думка є розумною.*

2. *Of* + підрядне речення.

*The question of how the hypothesis could be proved was largely debated. — Широко обговорювалося питання (Яке, в чому полягає?) про те, яким чином довести гіпотезу.*



### 3. Of + Ving:

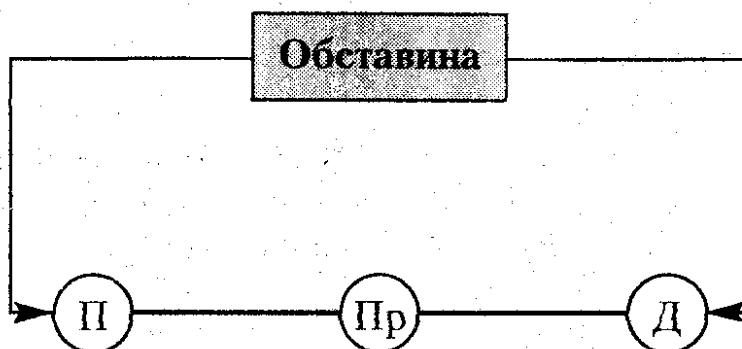
#### а) Ving без суб'єкта

*The idea of changing the parameters is not new.* — Думка (яка?) про те, щоб змінити параметри, не є новою.

б) Ving із суб'єктом, котрий може бути виражений іменником (у присвійному або загальному відмінку) або присвійним займенником.

*The idea of his (Mr. Dale's/Mr. Dale) conducting the investigation alone was rejected by all the members of the group.* — Думка про те, що він (м-р Дейл) буде виконувати дослідження самостійно, не була підтримана членами наукової групи.

## 6. ОБСТАВИНА



### § 1. ПРИЧИНА. УМОВА. ЧАС

Ці обставини можуть бути виражені:

1. прислівником, іменником з прийменником

*Many hard problems which seem unsolvable today will be solved tomorrow.* — Багато складних проблем, котрі, здається, сьогодні не мають рішення, завтра будуть вирішені.

*Because of its originality the technique is of interest.* — Методика є цікавою через свій нестандартний підхід.

*In case of doubt and for more details the reader is referred to the previous publications on the subject.* — У випадку сумнівів чи недостатньої інформації читач відсилається до вже існуючих публікацій з теми.

2. підрядним реченням

**Примітка 1.** Після сполучників *if, when, as soon as, after, before, till* вживається теперішній час замість майбутнього.

**Примітка 2:**

а) реальна умова/присудок головного речення стоїть у Simple Present /Future, підрядного — у Simple Present.

*If the new facts are considered, the experimental procedure differs from the former one.* — Якщо враховуються нові факти, хід експерименту змінюється в порівнянні з початковим.

*If the agreement is not signed, economic expectations will fail.* — Якщо угоду не буде підписано, надії в галузі економіки не справдяться.

Для вираження малої імовірності умови у підрядному реченні використовується **should**.

*If you should learn (= should you learn) the source of the error try to remove it.* — Якщо вам вдасться знайти джерело помилки, спробуйте позбутись його.

б) нереальна умова:

— що стосується теперішнього/майбутнього часу:

присудок головного речення виражено дієсловом

**should/would, could/might + інфінітив;**

присудок підрядного речення стоїть у **Simple Past**,

дієслово — присудок **to be** має форму **were**.

*If the process were simple it would be easily simulated in the laboratory.* — Якби процес був простим, його б можна було відтворити в лабораторії.

— що стосується минулого часу: присудок головного речення виражено дієсловом **should/would + перфектний інфінітив**, присудок підрядного стоїть у Past Perfect.

*If mankind hadn't ignored the biological and geochemical balances it wouldn't have done so much harm to nature.* — Якби людство зрозуміло взаємозв'язок біологічних та геохімічних факторів в природі, воно не завдало б їй такої величезної шкоди.

Зауважимо, що в українській мові присудок підрядного речення нереальної умови, що стосується теперішнього/майбутнього часу, виражається, на відміну від англійської, тією ж самою формою минулого часу.

Безсполучникові умовні підрядні речення починаються з присудка (чи його частини) **were, had, should, could, might**:

*Should you find your course wrong, never hesitate to give it up.* — Якщо ви виявите, що йдете невірним шляхом, знайдіть у собі сміливість відмовитися від нього.

*Were the process simple, it would be easily simulated in the laboratory.* — Якби процес був простим, його б можна було легко відтворити в лабораторії.

*Could we control the global balance in nature we wouldn't be faced up with ecological crisis today.* — Якби ми могли керувати рівновагою в природі, ми би не стояли зраз перед екологічною катастрофою.

*Had we continued our investigations the mechanism of the process might have been clear by now.* — Якби ми продовжили (тоді) наші дослідження, механізм процесу був би вже зрозумілим

**Примітка 3.** Умовні речення можуть бути введені наступними зворотами, які означають **якби не**

but for

if it were not for/were it not for

if it had not been for/had it not been for

*The new device could be more effective but for its large size (if it were not for its large size/were it not for its large size).* — Новий прилад міг би бути більш корисним, якби не його великі розміри.

*We would have been optimistic about the results of our new attempts if it had not been for an unexpected failure of the monitor (had it not been for an unexpected failure/but for an unexpected failure).* — Ми б могли на всіх підставах очікувати позитивних результатів наших зусиль (тоді), якби не неочікувана поломка монітора.

3. **Ving-** та **Ved<sub>3</sub>**-зворотами, які являються згорнутими підрядними реченнями (тип підрядного зв'язку визначається за контекстом):

а) **Ving** та **Ved<sub>3</sub>**-зворотами без суб'єкту. Суб'єкт головного речення ідентичний суб'єкту **Ving** та **Ved<sub>3</sub>**.

**Ving** — вказує на активний стан, **Ved<sub>3</sub>** — на пасивний стан.

*Covering a wide range of problems the book is of importance for both theorists and practitioners.* —> *Since/when/if the book covers a wide range of problems it is of importance...* — **Оскільки/коли/якщо книга розглядає широке коло проблем, вона є цінною як для теоретиків, так і для практиків.**

*Observed under extreme conditions the phenomenon cannot be considered universal.* —> *As the phenomenon is observed under extreme conditions it cannot be considered universal.* — **Оскільки це явище виявляється в екстремальних умовах, його не можна вважати універсальним.**

**Примітка.** Однак трапляються випадки, коли суб'єкт особової форми дієслова не співпадає з суб'єктом **Ving**-звороту.

*Using this analysis it is possible to predict the results.* —> *If one uses this analysis/if this analysis is used it is possible...* — **Використовуючи цей аналіз/якщо використовувати цей аналіз/на основі цього аналізу можна передбачати результати.**

Це в основному відбувається тоді, коли суб'єкт особової форми дієслова виражений іменником на означення неживих істот (часто з

присудком пасивного стану), або коли речення починається з безособового звороту *it is necessary, it is considered* тощо. У таких випадках зворот може бути перекладений: дієприслівниковим зворотом, неозначено-особовим реченням, комплексом прийменник + іменник.

*Employing the new technique* water was used in the experiment. — **Застосовуючи нову методику**, в експерименті використовували воду. / Згідно з новою методикою...

*Based on conclusions of the most complete investigations* an increase in temperature would increase the loss of energy. — **Якщо базуватися на висновках повного аналізу**, можна вивести, що підвищення температури зазвичай призводить до підвищення втрати енергії. / Виходячи з висновків повного аналізу... / На основі висновків повного аналізу...

Перфектні форми *Ving* та *Ved<sub>3</sub>* використовуються для означення попередніх подій.

*Having described the method in detail* we gave some advice as to its application. —> *After we described (had described) the method in detail...* — **Після того, як ми дали детальний опис методу**, ми запропонували низку рекомендацій стосовно його застосування.

*Having been developed in the last century* the technique needs some improvement. —> *Since the technique was developed in the last century...* — **Через те, що цю методику було розроблено ще в минулому столітті**, вона потребує вдосконалення.

Часто звороти вводяться сполучником (*when, until, after, if, while, though*):

*When considered in the ecology context*, the technique is of great interest. —> *When the technique is considered in the ecology context*, it is of great interest. — **Метод є цікавим, якщо його розглядати в контексті проблем екології**.

*Until checked the data cannot be relied upon.* —> *Until the data are checked* they cannot be relied upon... — **Дані не можна приймати до повної перевірки**. (Доки дані не буде перевірено, на них не можна покладатися).

**Примітка.** Зворот також може вводитися прийменниками *in, on, by*:

*in* — вказує на одночасність дій у звороті та у головному реченні;

*on* — вказує на послідовність дій (*Ving* вказує на дію, що передуює дії, вираженій присудком);

*by* — вказує на умови, обставини, за яких відбувається дія;

*In explaining the disagreement one should remember some facts. —> When one explains the disagreement one should remember some facts. — Коли пояснюється ця невідповідність/при поясненні цієї невідповідності/пояснюючи цю невідповідність, треба пам'ятати про деякі факти.*

*On establishing the relationship between these two facts it is possible to foresee the outcome of the experiment. —> After the relationship between these two facts is established... — Після того як встановлено залежність (після встановлення залежності між двома фактами/встановивши залежність), можна передбачити результати експерименту.*

*By satisfying his curiosity scientist contributes to the world progress. —> Scientist satisfies his curiosity and this contributes into the world progress. —> Scientist satisfies his curiosity, which contributes... — Задовольняючи свою цікавість, вчений тим самим сприяє прогресу./Вчений задовольняє свою цікавість і тим самим...*

б) *Ving* та *Ved<sub>3</sub>*-звороти із суб'єктом.

Неперфектна форма *Ving* та *Ved<sub>3</sub>* вказує на одночасність дій, які виражені цією формою та присудком головного речення; перфектна форма — на попередню дію.

*The problem of food becoming one of the most important problems today, search for effective methods of farming is necessary. —> Since the problem of food becomes one of the most important problems today, search for effective farming is necessary. — Оскільки проблема харчування стає зараз однією з найбільш важливих, необхідний пошук нових ефективних форм хазяйнування.*

*Scientists being heavily involved in fashionable problems, some urgent questions remained neglected. —> As scientists are/were heavily involved in fashionable problems, some urgent problems have remained neglected. — Оскільки вчені займаються/займалися модними напрямками, деякі невідкладні питання залишились поза їхніми інтересами.*

*Both laboratories having developed a successful way of co-operating, fundamental research in this field made a remarkable progress. —> Since/after both laboratories had developed a successful way of co-operation, fundamental research in this field made a remarkable progress. — Після того як/оскільки між цими двома лабораторіями встановилися відносини співробітництва, значного розвитку набули фундаментальні дослідження у цій галузі.*

*A new technique having been developed in the field of meteorology, scientists can make long-range weather forecasts today. —> After/since a new technique was developed in the field of meteorology, scientists can make... — Після того як/оскільки в метеорології було розроблено новий метод, сьогодні вчені можуть давати довгострокові прогнози.*

**Примітка.** У мові наукової прози зворот, що стоїть у кінці речення, виконує функцію супроводжуючого речення, що виражає супутні обставини. У такому випадку зворот передається в українській мові самостійним реченням або реченням, що вводиться сполучниками *а, та, причому (до того ж), при цьому*. В англійській мові він може починатися також із сполучника *with/without* (який на українську мову не перекладається; сполучник *without* робить висловлене у звороті заперечним).

*The progress made in this field is remarkable, more people being engaged and more money allocated. — У цій галузі досягнуто великих успіхів; причому було залучено значну кількість вчених та виділено великі кошти.*

*One of the main tasks today is to handle the environmental crisis, (with) all the other problems becoming of secondary importance. — Однією з головних задач сьогодні є застосування термінових заходів з оздоровлення оточуючого середовища; а (при цьому) усі інші проблеми відходять на другий план.*

4. Зворотом без дієслівної форми (за рахунок редукції дієслова-зв'язки *to be*).

*If (when) in doubt (you may) look up the reference book. —> If (when) you are in doubt... — Якщо у вас виникли сумніви, ви можете звернутися до довідника.*

*Though (while) interesting for general public the question is of little importance for scientists. —> Though the question is interesting for general public it is of little importance for scientists. — Незважаючи на те, що питання цікаве для неспеціалістів, воно не є особливо значущим для вчених.*

Такі звороти вводяться сполучниками *when, if, until, though* та ін., після яких стоїть іменник з прийменником чи прикметник. Вони також являють собою згорнуте підрядне речення, суб'єкт якого ідентичний суб'єкту головного речення.

## Словосполучення з формами *Ving* та *Ved<sub>3</sub>*

### *Ving*

roughly speaking

strictly speaking

generally speaking

turning to

seeing that

stating that

other conditions (things, facts) being equal

— грубо кажучи

— строго кажучи

— в широкому смислі

— звертаючись до

— якщо взяти до уваги, що

— якщо сформулювати, виразити

— за рівних інших умов

### *Ved<sub>3</sub>*

given

seen

stated

granted

given that

granted that

as compared

(as) contrasted

(as) opposed

as emphasised earlier

as stated above

as mentioned previously

broadly considered/seen

when exposed to

unless otherwise (specially) stated (indicated, specified)

except where otherwise stated (indicated, specified)

— якщо дано, якщо є, якщо

— якщо розглянути

— якщо сформулювати

— якщо припустити

— якщо

— " —

— у порівнянні

— на протигагу

— " —

— як було підкреслено вище

— як зазначено/встановлено вище

— як згадувалося раніше

— у широкому розумінні

— під дією чогось на

— якщо не визначено окремо

— окрім окремо визначених випадків

## § 2. СУПУТНІ ОБСТАВИНИ

Ці обставини можуть бути виражені:

1. залежним реченням, що вводиться сполучниками *which, so, and*

*The data were found incorrect, which proves that the instruments were unreliable. —> The data were found incorrect and this proves that the instruments were unreliable.* — Дані виявилися невірними, і це свідчить про те, що було використано ненадійні прилади.

2. *Ving-* та *Ved<sub>3</sub>*-зворотами:

а) без власного суб'єкта

Зворот являє собою згорнуте залежне речення супроводжувального характеру і перекладається або дієприслівниковим зворотом, або окремим залежним реченням (яке іноді вводять сполучники *та, і, при цьому, причому*).

*Some theorists work isolated from experimentors, disregarding practical application of their ideas. —> Some theorists work isolated from experimentors and they disregard practical application of their ideas.* — Деякі вчені-теоретики працюють відірвано від експериментаторів, нехтуючи практичною значимістю своїх ідей/при цьому вони нехтують...

*Employing the most suitable technique they try to get a convincing proof of the correctness of the chosen approach. —> They employ the most suitable technique and try...* — Використовуючи найбільш прийнятні методика, вони намагаються отримати переконливий доказ правильності/вірності обраного підходу.

*Ving-*зворот зустрічається з дієсловами розумової діяльності (наприклад, *suggest* — говорити, свідчити, наводити на думку, мати на увазі; *indicate, show* — вказувати, показувати; *imply* — мати на увазі, говорити тощо).

Цей зворот можна трансформувати у залежне речення, що вводиться сполучниками *which/so/and* і відноситься не до конкретного слова цього речення, а до всієї думки, вираженої головним реченням.

*The announcement of the discovery was followed by an upsurge of scientific activity in the field, suggesting a great importance of the event. —>... which suggests/so/and this suggests...* — Після того, як



було оголошено про це відкриття, спостерігалася потужна хвиля активності вчених, **що свідчить/і це свідчить про важливість даної події.**

б) із суб'єктом

**Ving-/Ved<sub>3</sub>**-зворот стоїть в кінці речення і являє собою згорнуте речення супроводжуючого характеру (про його початкову позицію та іншу функцію у кінцевій позиції див. § 1). Іноді зворот вводиться прийменником **with** (на українську мову прийменник не перекладається) і, як правило, відокремлюється від головного речення комою. Перекладається окремим реченням, яке може приєднуватися до головного сполучниками **а, та, і, причому, при цьому.**

*The new approach has a number of advantages over the previous one, the chief merit being its relatively low cost. —> ... the chief merit is its relatively low cost. — Новий підхід має ряд переваг у порівнянні з попереднім, основна його перевага полягає в його відносно низькій ціні.*

*Nature is being mercifully damaged by man, with the final impact on it being unpredictable. —> ... and the final impact on it is unpredictable. — Природа безжалісно руйнується людиною, і неможливо передбачити наслідки цього процесу.*

### § 3. ОБСТАВИНА МЕТИ

Обставина мети може бути виражена:

1. підрядним реченням мети;

2. інфінітивним зворотом, що є згорнутим підрядним реченням мети (може вводиться сполучниками **in order, so as**):

а) без суб'єкту

*Some facts should be considered in order (so as) to explain the phenomenon. —> ... so that we could explain the phenomenon. — Щоб пояснити це явище, слід врахувати деякі факти.*

б) зі суб'єктом, який вводиться прийменником **for**

*It is necessary to employ reliable technique for these factors to be considered. —> ... so that these factors are considered. — Для того, щоб ці факти було враховано, слід використовувати надійні методи дослідження.*

**Примітка.** Слід розрізняти інфінітив/інфінітивний зворот у функції обставини мети і у функції вставного виразу. Порівняйте:

*To summarize, science and technology change every aspect of our life.*  
— *І на закінчення слід сказати, що наука і техніка вносять зміни в усі сфери життя.*

*To summarize the obtained results it is necessary to examine the outcome of the experiments.* — *Щоб підсумувати отримані дані, треба проаналізувати результати експерименту.*

### Інфінітивні вставні вирази

to anticipate	— забігаючи наперед, слід сказати, що
to begin with	— перш за все слід сказати, що
to be sure	— безумовно
needless to say	— звичайно, зрозуміло, певна річ
not to mention	— не говорячи вже про
to mention only	— пригадаємо лише, назвемо тільки
to put it another way	— інакше кажучи
to put it more exactly	— точніше
to say the least	— щонайменше
to say nothing of	— не кажучи за
so to say	— так би мовити
suffice it to say	— досить сказати, що
to conclude	— на завершення зазначимо, що
to summarise	— —"
that is to say	— інакше кажучи
to tell the truth	— відверто кажучи
to take an example	— наприклад

## § 4. НАСЛІДОК

Ця обставина може бути виражена:

1. підрядним реченням, що вводиться сполучником *so/ so that* або реченням, що поєднується з головним сполучником *and*;

2. *Ving*-зворотом, який є згорнутим підрядним реченням

*The mixtures react forming a gaseous substance.* —> *The mixtures react and form a gaseous substance.* — *Ці суміші взаємодіють, і утворюється (з утворенням) газоподібна речовина.*

*The process is difficult giving rise to more serious problems. —> The process is difficult and it gives rise to more serious problems. — Це складний процес, і результатом його можуть стати більш серйозні проблеми;*

3. інфінітивним зворотом, який є згорнутим підрядним реченням наслідку

*He came into the laboratory to see that half of the samples were ruined. —> He came into the laboratory and saw... — Він зайшов до лабораторії і виявив, що половина зразків була у непридатному стані.*

Інфінітивний зворот після *too* (занадто), *enough*, *sufficient(ly)* (достатньо) може використовуватися з суб'єктом та без нього:

а) підмет головного речення є суб'єктом для дії, вираженої інфінітивом у звороті

*The situation is too complicated to be neglected. —> The situation is complicated and (it) cannot be neglected. — Ситуація достатньо складна, щоб її можна було не враховувати (і її треба враховувати).*

*The temperature is sufficiently low to destroy the material. —> The temperature is low and (it) can destroy the material. — Температура є досить низькою, щоб зруйнувати матеріал (і може зруйнувати матеріал).*

б) з суб'єктом, що вводиться прийменником *for*

*The conclusions are too hasty for the commission to consider them to be objective. —> The conclusions are hasty and the commission cannot consider them to be objective. — Висновки занадто передчасні, щоб комісія могла їх вважати об'єктивними (і комісія не може їх вважати об'єктивними).*

*The conditions are good enough for meteorologists to make their observations. —> The conditions are good and the meteorologists can make their observation. — Умови достатньо добрі, щоб метеорологи могли проводити свої спостереження (і метеорологи можуть проводити свої спостереження).*

Дієслова, які вживаються в інфінітиві у функції обставини наслідку:

to bring about — викликати, породжувати

to give rise to	— —" — —"
to form, to give	— утворювати, давати
to make	— —" —
to produce	— —" —
to yield	— —" —
to lead to, to cause	— призводити

## 7. ФОКУСУВАННЯ УВАГИ ЧИТАЧА

Оскільки в письмовому тексті неможливо голосом виділити той елемент, до якого автор хоче привернути увагу читача, вживаються певні граматичні структури, які відповідають цій меті. Такі формальні лексичні підсилювачі, як **really, of course, surely, certainly** тощо, не завжди є достатніми.

Для виділення головної інформаційно навантаженої частини висловлювання застосовуються наступні засоби:

1. Рамочна конструкція **it is... that /who**, за допомогою якої можна сфокусувати увагу читача на необхідному елементі інформації

*It is from scientific discoveries and inventions that new knowledge arises.* — Нові знання надходять  **саме**  завдяки новим відкриттям та винаходам.

*It is because factories burn waste materials that the level of air pollution is increasing.* — Рівень забруднення повітря зростає практично через те, що фабрики спалюють відходи.

*It is not until after the method is used that it can be recommended for general application.* — Тільки після того, як метод буде апробовано, його можна буде рекомендувати для широкого застосування.

*It is not until quite recently that man realised the damage he causes to nature.* — Тільки нещодавно людина усвідомила шкоду, яку вона чинить природі.

2. Підсилювальне **do**, яке підкреслює присудок, виражене інфінітивом дієслова без частки to. Ця конструкція є можливою тільки для Present та Past Simple. В українській мові можуть використовуватися слова: *дійсно, насправді, фактично, все ж таки* тощо.

*The method **does** prove effective. —> The method really proves effective. — Метод **насправді** виявляється (є) ефективним.*

*We packed the instruments carefully but they **did** get damaged during transportation. / ...but they nevertheless got damaged. — Ми запакували прилади добре, проте вони все ж таки були пошкоджені при транспортуванні.*

3. Зміна порядку слів (інверсія підмета та присудка).

Для наукової прози є характерними наступні випадки зміни прямого порядку слів:

а) виділення підмета (особливо в тих випадках, коли він є розгорнутим). Змістову частину складного присудка ставлять на початку речення, а допоміжне дієслово (перша частина присудка) стоїть безпосередньо перед підметом (т. з. розірваний присудок).

***Given** in italics **are** the words that the author would like to emphasize. — The words that the author would like to emphasise are given in italics. — Курсивом виділені слова, на які автор хоче звернути увагу.*

***Facing** mankind totday **is** the problem of exhaustible natural resources. —> The problem of exhaustible natural resources is facing mankind today. — Сьогодні перед людством стоїть проблема вичерпання природних запасів.*

***Available** at present **is** the information on general aspects of the problem. —> The information on general aspects of the problem is available at present. — Наразі можна отримати інформацію щодо загальних питань цієї проблеми.*

**Примітка.** Переклад зручніше починати зі слів, які містяться між змістовою частиною присудка та допоміжним дієсловом

б) виділення присудка.

Заперечні словосполучення, після яких порядок слів змінюється:

never	— ніколи
nowhere	— ніде
neither	— жоден (з двох), теж не
only	— тільки
nor	— також не
hardly	— навряд, навряд чи

scarcely	— —" —
hardly ever	— майже ніколи
little	— мало
no longer	— більше ні
seldom	— зрідка
rarely	— —" —
hardly... when	— як тільки
scarcely... when	— —" —
no sooner... than	— —" —
not only... but also	— не тільки ..., а й

**Only** after thorough analysis **did** the side-effects of the process manifest themselves. — Побічні ефекти процесу було виявлено тільки після ретельного аналізу.

**Never** in the past **could** we witness such an avalanche-like process of information. **Nor did** the exchange of scientific ideas play so great a role as now. — Ніколи раніше ми не спостерігали такого потоку інформації. Обмін ідеями також не відігравав такої великої ролі, як зараз.

**Seldom** does a scientist perform well if the work is not interesting or challenging. — Лише зрідка вчений демонструє високу продуктивність у роботі, яка його не захоплює.

**No sooner** had this new branch of research come into being **than** a remarkable progress was witnessed in the field. — Як тільки виник цей новий напрямок дослідження, у цій галузі було відзначено значний прогрес.

**Примітка.** У таких реченнях перед підметом стоїть допоміжне дієслово у відповідній формі, а після підмета — смислове дієслово.

в) виділення інформації головного речення

Цього досягають шляхом інверсії в підрядних реченнях (наприклад, поступки). Цього можна досягти двома шляхами: 1) поставити на початку речення другу (іменну) частину присудка; 2) поставити перед цією другою частиною підсилювальні слова *however, no matter how*.

**Abundant** as/though natural resources of the Earth are (may be) they are not inexhaustible. **However** abundant natural resources of the Earth are (may be) they are not inexhaustible. **No matter how**

*abundant natural resources are...(Though natural resources of the Earth are (may be) abundant they are not inexhaustible).* — Хоча земні багатства численні, їм є межа. Незважаючи на те що земні багатства є численними, їм є межа. Якими б численними не були земні багатства, їм є межа.

Інверсія всередині **Ving**-звороту здійснюється за допомогою підсилювального підрядного речення **as it does/did**, яке уклинюється у **Ving**-зворот між прислівниковою формою та додатком.

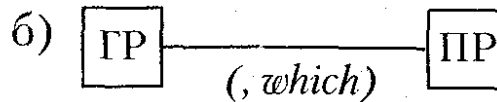
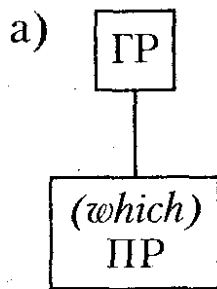
*The assumption cannot be accepted disagreeing as it does with experimental evidence. —> The assumption cannot be accepted as (because, since) it disagrees with experimental evidence.* — Це припущення не можна прийняти, оскільки воно розходиться з експериментальними даними.

# ТРЕНУВАЛЬНІ ВПРАВИ

## РЕЧЕННЯ

**1. А. Визначте, чи відноситься підрядне речення (ПР) до:**

- а) якогось слова у головному реченні (ГР) як його означення;
- б) всієї першої частини (ГР) складного речення



### Б. Перекладіть.

1. By interacting with one another, scientists may contribute to each other's effectiveness, which suggests that contacts among colleagues are very fruitful.

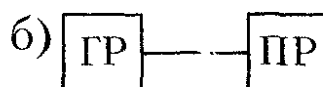
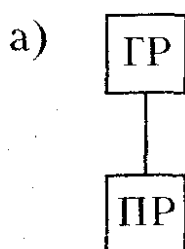
2. Companies will invest mainly in research teams which are staffed and equipped to remain in the first international rank.

3. Higher education needs to be reconstructed and well managed to reach more people, which is not an easy task.

4. We must change our higher education system from one existing for a small minority to a more open system which brings many more Americans to a higher level of education.

5. This country badly needs a generation of senior managers and administrators with high-level general and management education, which is still another sign of a more economic focus in the planning of higher education.

**2. А. Поставте запитання до підрядного речення /ПР/. Виберіть речення, які відповідають схемам:**





## **Б. Перекладіть.**

1. We believe that the principles of mathematics, science and technology must now be a part of the foundation for an excellent liberal and general education.

2. The book offers the training that gives you hands-on programming experience.

3. Like Galileo with his telescope lenses, we have only the faintest glimpse of the universe our technology is beginning to unveil.

4. More than 80 billion pounds of toxic wastes that are dumped in the USA in one year's time is a primary environmental problem of the country.

5. Modern comprehension of the universe scientists have developed to date has deepened considerably with the help of photographs of galaxies.

6. It has been calculated that one European country will draw 85 per cent of its foreign earnings from the sale of information in one form or another (patents, licences, royalties, technical know-how, etc.).

7. The laboratory has no subsidies today. So, one problem in this research is that it is impossible to think of experiments that might test some of the hypotheses that have been advanced over the years.

8. That energy crisis requires both technological/economic and societal efforts has now become evident.

9. You have to crawl before you can walk, but this study shows that we can crawl pretty fast — recently obtained data are contributing to a new optimism about treating AIDS that was absent just four or five years ago.

10. Imagine you are a scientist conducting research on the Moon. What are the things you may need first of all?

11. There are some promising signs that mankind will find solution to the critical environmental situation it has found itself in.

12. That more and more people report their contacts with newcomers from other planets surprises no one today.

13. Daring but quite meaningful would be an innovation to create a university that is not broken into traditional departments but rather organised around great concepts.

**3. Визначте підмет і присудок головного та підрядного речень. Перекладіть.**

1. The question behind the research is why the traditional technique is of little use in the new conditions.

2. The main principle of the approach is that it considers pressure and temperature as independent values.

3. Whether tomorrow is bright depends on what we do today.

4. The explanation they provided for the emergence of the virus is well grounded.

5. A large amount of hard work the group did has gone into the monograph on the subject.

6. The year's package of ideas the laboratory suggested has some unavoidable omissions.

7. They suggested workshops and discussions might stimulate scientific interest among the members of the group.

**4. Назвіть підрядне речення (ПР) та поставте до нього запитання. Зверніть увагу на слова, які вводять ПР. Перекладіть.**

1. Our future depends largely on **how** lawmakers deal with issues of air, water and soil pollution.

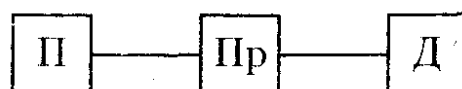
2. No one is exactly sure **when** plants migrated from water to land, but it may have been about 400 million years ago.

3. In the short time **that** this technology has been available, much new information has been obtained about **why** some species of animals go extinct and others survive.

4. Researchers need to understand **how** a mental disorder may affect someone's ability to stop using drugs.

5. To be able to predict **what** effects increasing amounts of CO<sub>2</sub> in the atmosphere will have on future climates forecasters need to know **how** good their models are.

**5. Яка частина складного речення є його підметом? Заповніть схему речення. Перекладіть.**



1. Whether to build conventional power stations, based on coal or oil, or nuclear stations is being decided on economic grounds.

2. That the data obtained should not be a privilege of one nation, social group or private company has been realised by the scientific community at the beginning of the research.

3. What the project will include remains to be debated.

4. How human health could be improved through the use of animals became evident at the recent symposium.

5. Researchers are now experimenting with ways to grow plastics instead of manufacturing them. When this project turns into reality will become clear from the research work on this plastic revolution.

6. Whether man can do better than Nature should be shown by man himself.

**6. Перетворіть прості речення на складні, розкривши дужки. Назвіть підмет та присудок в обох частинах складного речення (ГР та ПР). Зверніть увагу на роль слів *before*, *after*, *since*, *for*, *as* у простому та складному реченнях. Перекладіть.**

1. The method was recognised as workable **after** the test (showed its value).

2. A prognosis is helpful if it is made **before** the actual event (takes place).

3. The newly discovered medicine is very useful **for** patients (rehabilitate much faster with the drug).

4. A foreign language is the skill he could not master **since** his childhood (and youth were the period of complete isolation from the outside world).

5. The idea was supported **after** the lab meeting (discussed its possible effect).

6. The side effects of the drug were observed **after** a course of treatment (was over).

7. The harmful impact of man on nature was predicted **long before** the industrial revolution (made it quite evident).

**7. Перекладіть, звертаючи увагу на порядок слів в українських реченнях. Яку роль відіграє артикль (неозначений чи нульовий) та елементи обставини при передачі інформації українською мовою?**

**a)**

1. A new method was suggested in the study.
2. Numerous hypotheses were put forward.
3. First, a modern approach should be developed. Second, qualified personnel must be involved.
4. A number of critical articles were written on the subject.

**b)**

1. A new method was suggested to investigate the process.
2. An original model was proposed, which could improve the analysis.
3. Later an idea was put forward to modify the existing model.
4. A plan of actions was developed which will streamline the activity of the institution.

**c)**

1. An international team of scientists discovered a 5 000-year-old ship in a pit beside the Great Pyramid in Egypt. Evidence of a second pit was noted at the time of the original excavation. Some time later a permission was obtained to insert sensors into the pit. Engineers of various qualifications were engaged in the work. The latest technology was employed. A special air-lock was provided to exclude the outside air from inside the pit.

2. Cocoa is not a natural crop in Ghana. A mere 80 pounds were exported in 1879 when it was first brought to Africa.

3. Good management is badly needed in the area, but that is only part of better farming; new technologies are also important.

4. Promising students are being drawn out of developing countries by the western economies today. Over 800 000 specialists were drained away from the Third World between 1970 and 2000.

5. Major road construction programmes are underway. A number of plants are already in operation along the main rivers of the country. About a dozen of sites have been identified at which power generating plants could be built.

6. Petrol exploration has been carried out with France assistance since the late 1990s. A great number of industrial projects are in progress or planned. The country's involvement in the international activities has grown considerably in the recent years.

7. Universally free and compulsory education for all children up to the age of 17 is regarded as first priority under the reconstruction

programme. The number of educational institutions has increased, and the number of teachers and students has grown too. A network of training centres for the young has been extended throughout the country. Extensive co-operation began with world leading educational centres when a series of agreements were signed on aid and further development.

8. The country is notable for its waterways. However, land transport within the large cities is being gradually improved. Modern road networks have been built to connect the country with its neighbours. English language learning centres have been mushrooming all over the country to meet the increasing co-operation needs.

## **ON YOUR OWN**

### **Was Sir Isaak Right?**

As every physics student learns, there are four known forces of nature: gravity, electromagnetism, a "strong" force that binds atomic nuclei, and a "weak" one that governs certain types of radioactive decay.

Recently researchers at the Los Alamos National Laboratory announced that they may have found the best evidence yet for a hypothetical "fifth force". If confirmed, their findings could mean that Sir Isaak Newton's famous inverse-square law of gravity is in danger of losing the exalted position it has held for three centuries. "It's like saying Mom and apple pie's no good anymore", admits the leader of the gravity project. "You just don't do that lightly", he adds.

### **Now Try This:**

1. What is meant by "strong" and "weak" forces?
2. Could you say what discovery was made at the Los Alamos National Laboratory?
3. Do you see the consequences of the findings for the future of the science?

### **Back From Death**

It started out to be a simple exploratory operation. Then, suddenly, the patient's heart stopped. Her brain waves started levelling off. The medical team immediately began emergency treatment to

try to start the heart again. At last the chief surgeon said the patient had died. Minutes later, much to everyone's amazement, the "dead" patient came back to life. Her heart started and her brain waves began to assume normal patterns. Later, she told the doctors she had been fully aware of everything that had happened while she was "dead". She believed she came back to life because she wanted so badly to live longer. She said death was not frightening, but she was not ready to go yet. The experts admit they have no satisfactory explanations for these death or near-death experiences. They are sorry to say they do not fully understand life — and they do not fully understand death.

*Now Try This:*

1. What was the doctor's announcement?
2. What did the patient tell the doctors later?
3. Why did she come back to life? What were her impressions of death?
4. Could the experts account for these experiences?
5. What did they have to admit?
6. Find all the instances of that-clause without the marker.

### **Global Change**

For more than 150 years a major activity of geologists has been to elucidate the great episodes of global change natural process has caused. Today the challenge has expanded for humans have become agents for environmental degradation with effects comparable to, and in some instances more profound than those of nature.

In assessing what is happening and in formulating remedial measures, earth scientists will have at their disposal a great array of instrumentation, data storage, and computational capabilities. In addition, geologists are accustomed to being engaged in co-operative international efforts.

*Now Try This:*

1. What is the cause of global change in nature?
2. Why has the situation changed today?
3. In what sense are changes caused by man and those by nature comparable?
4. What does "for" mean in the second sentence?

## **Stimulating Environment**

One view of a laboratory is that it is a facility that provides services and equipment so that its scientists could conduct research and development activities. A somewhat different view is that it is a system of interacting scientists in which the inhabitants stimulate each other to produce high quality R&D.

Under the assumption that a laboratory could be such a stimulating environment we shall try to answer some basic questions about contacts between people. For answers to these questions have important implications for the organisation of existing and for the establishment of new labs or research teams. Here are the questions: Does it matter how often a scientist contacts his colleagues? If so, what is the optimum amount of contacts? For whom are the contacts most useful? Does it matter how the contacts originated?

### *Now Try This:*

1. What is the main purpose of a lab? Give both viewpoints.
2. How could answers to the questions help a lab chief? What does the word "for" mean in the fourth sentence?

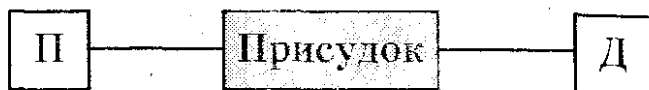
## **Scientific Reasoning**

Scientific knowledge begins with a question — not surprising since there cannot be answers unless there are questions. Some phenomenon of nature is observed, we become curious about it and wish more information. It is nearly impossible to obtain an answer to any important question in science unless we first make a guess about what the answer may be. This guess is our hypothesis. The guessing is not a random affair. The guess will be based on various observations. This process, in which we combine the specific bits of information and logic to produce a more general statement (a hypothesis) is known as induction.

### *Now Try This:*

1. What are the stages of scientific knowledge development?
2. Does nature answer all your questions without you making the first guess?
3. What is "induction"?

## ПРИСУДОК



**1. А. Перекладіть речення, зважаючи на умовні позначки характеру дії, що подані в дужках.**

a) We work at the laboratory. (—)

b) We are working at the laboratory. (~)

1. Устаткування буде працювати/працюватиме завтра. (—; ~)

2. Ми будемо обговорювати цю працю. (—; ~)

3. Вони завершують випробування. (—; ~)

4. Температура зростає. (—; ~)

5. Тиск різко падає (—; ~)

6. Реакція відбувається повільно (—; ~)

**Б. Змініть українські речення у праві А. таким чином, щоб вони були однозначними за часом та характером дії.**

*Наприклад:* Устаткування буде працювати з 10.00 до 12.00 (~)

### **2. Перекладіть:**

a) *визначте характер дії, вираженої присудком речення. Доповніть висловлювання таким чином, щоб нейтралізувати неоднозначність.*

1. Вони ставлять складні експерименти (3 варіанти).

2. Лабораторія розробляє новий лікарський засіб (3 варіанти).

3. Даний метод використовується з застереженням (2 варіанти).

4. Вони проводять випробування (3 варіанти).

5. Прилад працює справно (2 варіанти).

6. Датчик показує невірні дані (2 варіанти).

b) *визначте, в якому часі може бути перекладений присудок.*

1. Молодий фахівець виступав із доповіддю (2 варіанти).

2. Минулого року він декілька разів брав участь у семінарах (2 варіанти).

3. Сьогодні ситуація змінилася (2 варіанти).

v) *перекладаючи речення, зверніть увагу на можливість вибору часу та виду (доконаний/недоконаний) присудка.*



*Наприклад:* The firm **has paid great attention** to the training of programmers.

а) фірма приділяє велику увагу підготовці програмістів

б) ...приділила

в) ...приділяла

1. They have tried a new approach (3 варіанти).

2. The data agreed with experiment (2 варіанти).

3. They have paid special attention to new technologies (3 варіанти).

4. During the experiment they determined the nature of mistakes (2 варіанти).

5. The group has greatly contributed to the realisation of the project (3 варіанти).

**3. Визначте присудок. Зверніть увагу на його склад. Перекладіть.**

1. The substances may to some extent be divided into reactive and non-reactive.

2. The phenomenon is probably underestimated.

3. The defect can and in many cases is easily detected.

4. The approach will be without any doubt accepted.

5. The situation is thoroughly investigated and analysed.

6. Further investigations have been proposed and discussed.

7. The researcher should rethink and change the proposed line of investigation.

8. The study will be conducted and analysed by a group of experts.

9. The proposal has been put forward but not approved of.

10. This is the work he is known for and respected.

11. This is the world you wonder at and live in.

12. The recent research is but a slight alteration of and a minor addition to the general line.

13. We must discontinue teaching science as if it were a self-contained discipline existing of, by and for itself.

**4. Змініть реченням таким чином, щоб у них зберігався прямий порядок слів. Чому автор використав інверсію? Виділіть групу підмета, тобто підмет із словами, що до нього відносяться.**

1. Interesting for the general public might also be the recent publications of Dr. X who specialises in absorption and whose original view of the matter is worth considering.

2. Influenced by the work of expert groups was the study resulting in books that have had a lasting impact on the development of scientific thought in this country.

3. Ignored by the government is the necessity for scientific knowledge and for a comprehension of the relationship between science and technology, which remains among the priorities of today.

4. Given at the end of the chapter is advice on the best way to acquire, store and receive information.

5. Presented here is some knowledge of the history of the original investigation.

6. Suggested in the article are details concerning the procedure the innovation is likely to reach the world public.

7. Included in the drug assessing team is a pharmaceutical expert who is to evaluate the side-effects of the new drug.

8. Based on statistical analysis is the work that requires exact figures for its evaluation.

9. Generally accepted today is the existence of dark matter, the composition of which is unknown yet.

## **ON YOUR OWN**

### **Paying Back**

What we are and what we do are influenced more by cultural than biological factors. To be sure, our culture may introduce new selective forces. We have so degraded our environment, polluted our air and water, been lax in developing safeguards for nuclear technology, and failed to secure peace, to the point where human beings are the main force of selection on human beings. One of our main selective challenges today is to survive the mutagenes and carcinogenes that we have pumped into the environment.

### **Now Try This:**

1. What, in your opinion, is the main factor determining man's mode of living today?
2. What part does man play in shaping his existence?
3. Is there any way out of the situation man has put himself in?

## **Education in Modern Times**

We must change our Higher Education system from one oriented to a small minority to a more open system that brings many more people to a generally higher level of education than they attain now. In the world today, not only industry needs a greater supply of well-educated manpower: people generally need to be better educated if they are to have good opportunities of employment.

Current trends indicate that working life for most adults will in all probability require much more flexibility: people will need to adapt to moves between jobs and sectors, to periods without work, to part-time work, to sabbatical leave. These people will, no doubt, need access to the higher education system to retrain and re-equip themselves.

### *Now Try This:*

1. How do prospects for a better job change with education?

## **The 20th Century Killer**

See what you can do to help:

- Know the facts about AIDS. Use what you know to protect yourself. Teach your family, friends, and co-workers about it.
- Set a compassionate example for others. Show support and understanding for people who are infected with the AIDS virus and for those who have AIDS. Remember you can't get AIDS from being a friend.
- Become a volunteer. Call your local Red Cross or AIDS service organisation to learn how you can help.
- Sponsor a blood drive or donate blood. (Make sure you meet donor requirements before donating blood). This is one way to let others know that it is impossible for a donor to get AIDS by donating blood. Blood donations from healthy volunteers save lives.
- Support an AIDS fund-raising event or donate money.

### *Now Try This:*

1. Can you really do anything the text suggests?
2. What other steps would you suggest to try to kill the killer?

## **Teachers May Help**

Facing Americans today is the most serious problem of the dramatic decline in the effectiveness of the educational system. The probable causes for this state of affairs have been explored and debated endlessly and a long list of them has been assembled: broken homes, racial tension, inadequate schools, incompetent teachers, drugs, lowering of educational standards, excessive devotion to TV, abandonment of codes of ethics, etc.

There is little we could do to mend the broken homes or darken the television screens but there is a very great deal that we can do to improve the way we teach science in the universities. Any success that comes from our efforts will not only improve the scientific enterprise but expand the horizons and increase the competence for wise decisions by citizens at large and make more effective the education of those who will teach at schools.

### ***Now Try This:***

1. How is education related to the quality of people's life?
2. What is the main problem the American society is facing now?
3. What does the author take as a panacea for the societal ills?

## **Human and Wild Worlds**

As populations of wild animals dwindle, biologists are trying to figure out how to save them. Today's conservationists need to know the intricacies of reproductive physiology and nutrition, among other things, if they are to preserve the endangered animals. On some continents we have no more than 10 years left to study the natural populations of some species.

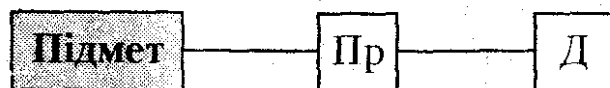
Neglected, to a certain extent, by natural biologists was the problem of impact of stress on animals. But the theme in the study of the wild deserves close attention. For, when severe, stress can lead to lack of reproduction and well-being. The obstacle in the research is that there is no reliable, agreed upon way to measure stress before pathology sets in. Devising such methods is the central research priority.

### ***Now Try This:***

1. What are the factors that influence animals' life?
2. What guarantees success for conservationists?

3. Did all the mentioned problems receive equal attention of the researchers?
4. What is the impact of stress on an animal?
5. What is the key question in stress research today?

## ПІДМЕТ



**1. У яких реченнях підмет виражений підрядним реченням? Визначте підмет та присудок підрядного та головного речень. Перекладіть.**

*а) В яких реченнях слова idea, fact можна опустити, не змінюючи зміст?*

1. The fact is quite original and needs further consideration.
2. The fact that the procedure is quite original needs further consideration.
3. The fact that has transpired in the recent publications supports the computed data.
4. The fact that the recent publications have not given evidence to support the new hypothesis proves that the hypothesis is invalid.
5. The idea that was first suggested as revolutionary proved to be only a sensational one.
6. The idea that new hypotheses may in the long run be just sensational tricks should remind the scientist of his responsibility.
7. The fact that the newly acquired data can easily be applied to the problem at hand helps in solution-finding process.
8. That the model is quite new leaves no doubt.

*б) Визначте підмет складних речень та перекладіть їх.*

1. How long could mankind live on the Earth?
2. How much effort it will require to complete the project appears to be the key problem of the meeting.
3. Whether we will get quality education in science largely depends upon teachers in science classrooms.
4. What provides public understanding of science, and in many cases fosters society's ignorance of science, could be seen in the educational system.

5. Who is responsible for such a situation remains to be investigated.

## 2. Визначте логічний підмет речення. Перекладіть.

1. It may be hard to reject as false or invalid all ideas that are in conflict with empirical data.

2. It has been observed that students learn best when searching a problem that is exceptionally challenging.

3. It might be of particular interest to observe a situation in nature in which an evolutionary change is not only observable but rapid as well. There seem to be few such cases.

4. It is necessary to learn to make decisions based primarily on empirical evidence.

5. It appears that through the habit of scientific thinking we would develop rational insight.

6. It is my personal view that a scientist should above all be an open-minded and critically-minded person.

7. It is not surprising that low requirements for entrance to the universities lead to low standards at the high schools.

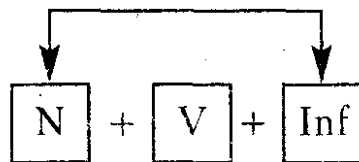
8. There seems to be little one can say in the situation.

9. There appear to be few who could realise the danger today.

10. There seem to be some new data on the nature of the phenomenon under investigation.

## 3. Визначте логічний підмет:

а) Замініть складнопідрядне речення із додатковим підрядним простим за моделлю:



1. It is said that the preliminary studies give good evidence.

2. It was expected that the new approach would give satisfactory results.

3. It is likely that the data may not agree with theoretical predictions.

4. It seems that the symptoms refute the hypothesis.

*б) Зверніть увагу на граматичний час, в якому стоїть присудок підрядного речення:*

1. It is widely known that life on Earth started millions of years ago.
2. It is generally recognised that Darwin contributed greatly into evolution science.
3. It is held that he learned a lot from the prominent scientists he worked with in his youth.
4. It is considered that in ancient time people knew various means of communication.

**4. Замініть речення на складні з додатковими підрядними.**

1. The group of experts is known to have prepared suggestions for laboratory exercises.
2. Workshops and group discussions are expected to contribute to the exchange of ideas on how to do things better.
3. A large amount of hard work is considered to have stimulated further successful attempts in the field.
4. Your advice, criticism and support are likely to make the research a success.
5. Science in a progressive society is supposed to be related both to technology and man.
6. Evolution theory in biology is known to be its most critical unifying principle.
7. There seems to be another point in the paper for closer consideration.
8. There seems to be a good opportunity for deeper analysis of the situation.

**5. Замініть речення на складні з підрядними додатковими.**

**Зверніть увагу на відсутність інфінітиву у реченнях.**

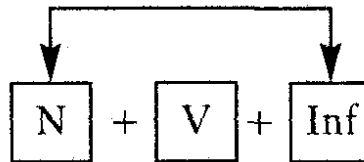
1. The ideas expressed at the workshop are seen as progressive.
2. The changes in man's life due to industrial revolution are regarded as fundamental.
3. The argument is considered convincing.
4. The experiments were taken as demonstrating the plausibility of the hypothesis.
5. The approach chosen for the research is assumed as giving scientific explanation to the facts.
6. The proposal was found sound and timely put forward.

6. Розгорніть означення, яке виражене зворотом (*Ved<sub>3</sub>*) у підрядне речення та визначте, чим виражений N у підрядному реченні.

1. The proposal found sound and useful was carefully studied.
2. The approach known to be universal does not work in the case concerned.
3. The ideas seen as crucial before remain important today.
4. His remarks appearing to highlight the main points were short and of no solid ground.
5. The danger likely to threaten man is now averted.
6. The hypothesis considered valid has been recently rejected.

**7. Перекладіть, використовуючи:**

а) конструкцію



1. Вважають, що завдання є надто складним для починаючого працівника.

2. Вважається, що науковий керівник допомагає аспіранту на головних етапах роботи.

3. Припускають, що кандидатська дисертація — це самостійне наукове дослідження.

1. Вважається, що молодий фахівець може самостійно/незалежно вирішувати наукові проблеми.

2. Можна очікувати, що у ХХІ столітті людина зможе встановити тісніший контакт з представниками інших цивілізацій.

6. Наша планета, безумовно, загине, якщо ми не змінимо нашу політику стосовно неї.

7. Малоімовірно, щоб така ідея оволоділа масами.

8. Практика, як відомо, найкращий критерій істини.

9. Єгипетські піраміди, на думку вчених, все ще залишаються загадкою для науки.

б) безособовий зворот *it is known that..., it is supposed that* тощо, відображаючи таку рису книжкового стилю, як безособовість:



1. Ми знаємо, що ваша фірма люб'язно запропонувала свою допомогу.

2. Співробітникам центру стало відомо, що проект отримав підтримку та субсидії на рік.

3. Всім здається, що новий підхід значно досконаліший.

4. Дослідники довели, що за цих умов модель є неприйнятною.

5. Вчені підтвердили, що останнє відкриття є революційним кроком у даній галузі.

6. Фахівці вважають, що наразі немає засобу для боротьби з цим вірусом.

7. Люди вважають, що вчені не завжди виправдовують ті кошти, котрі держава витрачає на науку.

8. У народі вірно вважають, що найпрактичніша наука — це життя.

**8. Дайте два варіанти перекладу, використовуючи *Ving* та інфінітив у ролі підмета.**

1. Навчати не завжди легше, ніж навчатися.

2. Читання без певної мети не може задовільнити творчу натуру.

3. Висловлення своєї точки зору вголос, якщо воно протирічить думці більшості, потребує сміливості.

4. Головна мета наукового пошуку — знайти істину.

5. Пошук істини — складний процес.

6. Розуміти природу науки означає бачити шляхи її розвитку.

**9. Визначте, хто виконує дію, виражену *Ving* та інфінітивом. Зверніть увагу на те, як оформлений власний суб'єкт при *Ving* та інфінітиві. Визначіть підмет речення. Дайте відповідь на запитання в дужках.**

1. For general public to understand "big ideas" in science is hard enough (What is hard?).

2. Students acquiring a deep understanding of the nature of science is the main goal of university education. (What is the main goal of university education?).

3. For a teacher to persuade his pupils without facts is a pointless effort. (What is a pointless effort?).

4. Man's modifying the environment altered the evolution of many species of plants and animals. (What altered the evolution of many species of plants and animals?).

5. Our controlling the specificity of mutation remains still a problem for future generations to solve. (What remains a problem for future generations to solve?).

*а) трансформуйте підрядні речення у Ving- та інфінітивний звороти:*

1. The fact that human life is sustained only by the death of other lives makes us think of the wild world around.

2. That we depend upon wild animals and plants is the main reason for the rapid development of agriculture.

3. The fact that pests are an enemy of domesticated animals and plants made man control them.

4. That people will stop devastating land in the near future is hardly possible (2 варіанти).

5. That bacteria could escape from the laboratory and cause an epidemic is quite possible. (2 варіанти).

6. The fact that native Americans were conquered more by European diseases than by European arms shows the connection between evolution and human welfare.

7. That there was a fierce debate about entering a new area of genetic engineering testifies to the risks of this new field.

8. The idea that human health problems will be solved by the turn of the century is not real (2 варіанти).

*б) перекладіть, використовуючи Ving- та інфінітивний звороти:*

1. Здається практично неможливим, щоб загальна теорія була невірною.

2. Очевидними є переваги злиття різних наук, результатом чого стає поява нової галузі науки.

3. Добре відомо, що з давніх часів вчених цікавила можливість розщеплення атому.

4. Давні уявлення про те, що Земля є нерухомою, зараз видається смішним.

5. Необхідність негайного вирішення проблем охорони навколишнього середовища продиктована подальшим погіршенням станом справ у цій сфері.

6. Причиною його відмови від посади прем'єр-міністра була його незгода з політикою, що її провадить президент.

7. Імовірність того, що в цьому районі Азії ще до нашої ери застосовували залізо та сталь, зараз широко обговорюється археологами та іншими фахівцями.

### 10. Перекладіть:

а) використовуючи модель *for* + **N + Inf**:

1. Неможливо, щоб учений знайшов нові факти, не будучи зацікавленим у цьому.

2. Необхідно, щоб комп'ютери стали невід'ємною частиною наукових досліджень.

3. Необхідно, щоб усі препарати, призначені для перевезення морем, було ретельно запаковано.

4. Бажано, щоб він вже отримав перші результати перед від'їздом.

5. Хотілося б, щоб якомога більше студентів були присутні на лекції цього видатного вченого.

6. Дивно, що ці лабораторії так швидко підписали угоду про співпрацю.

7. Важливо, щоб учений отримував якнайбільше новітньої інформації з наукових журналів, а не з монографій та підручників, котрі часто подають застарілі дані.

б) складним реченням з підрядним підметовим:

1. Цілком природньо, що й саме дослідження, й його впровадження мають виконувати одні й ті самі люди. (Той факт, що саме дослідження...)

2. Цілком можливо, що радіосигнали від цивілізацій з інших планет можуть досягнути Землі. (Те, що радіосигнали можуть...)

3. Те, що лабораторії тісно співпрацювали, допомогло їм виконати експеримент у найкоротший термін.

4. Той факт, що об'єм корисної інформації, що її можна почерпати з цієї монографії, не є великим, дуже ускладнює нашу задачу.

5. Складність матеріалів для читання звичайно викликає певні труднощі під час вивчення другої мови. (Той факт, що матеріали для читання є складними, зазвичай...)

6. Те, що задача, яка була надто складною для розв'язку десять років тому, стоїть сьогодні на порядку денному, свідчить про великі успіхи даної дисципліни.

7. Те, що деякі захворювання часто важко виявити на початковій стадії, становить велику небезпу для населення.

**11. У вправі 1 (а) виберіть речення, в яких підрядні речення можна замінити на *Ving*-зворот. Зробіть цю заміну.**

## **ON YOUR OWN**

### **Almost Human**

Whether humans are apes' descendants is still a question to answer. But that we have traits of our own leaves no doubt, as it comes to light in the recent research at the University in California.

The widely accepted portrait of primate society as a place where aggression is central and males are the leaders is basically wrong. Scientists have found, among other things, that in baboon society cooperation is much more important than aggression and that the emphasis is much more on intelligence than on group force. It's hard to imagine that the earliest humans weren't at least equally smart. So, these who want to root the beginning of the human experiment in a dumb, brute aggression are going to have to say that the earliest humans were lower than baboons. But nobody seems prepared to make that case.

So, modern humans' being aggressive, dominance-oriented and hierarchical urges scientists to come up with an explanation that it is almost uniquely human.

### **Now Try This:**

1. What is the question that still deserves scientists' attention?
2. What do the recent studies in California demonstrate? (Find all the sentences that can help you answer the question).
3. What makes researchers believe that baboons and modern humans have different genes? What does 'it' stand for in the last sentence?

## **Major Crisis on the Earth**

A major crisis on the Earth has been reported to have hit the flora and fauna of the planet sixty five million years ago. Enormous groups of animals and plants disappearing more or less simultaneously may be evidence of the crisis. It has been estimated that as many as 75% of species may have been eliminated.

Searching for the cause of this event has been a favourite pastime for many scientists and a great number of hypotheses have been put forward. Some observations suggest a catastrophic mechanism whilst others are indicative of more gradual processes.

### ***Now Try This:***

1. Information of what event is reported in the text?
2. What is the suggested period of time of the catastrophe?
3. Do scientists have grounds to regard the event as a disaster?
4. What impetus did the crisis give to the scientists?
5. Is there great certainty in all the scientific suggestions about the damage the crisis caused? Find the words in the text proving your point.

## **Scientific versus Poetic**

One of the most painful disappointments to the poetic and romantic mind is acceptance of the notion that life may not be eternal. A prevailing feeling is that science squeezes the beauty and warmth out of all that it touches. The remarkable advances of science and technology are viewed as satisfying only our material needs — from the harnessing of steam and electricity to the development of antibiotics and vaccines. Very rarely are the achievements of science thought of as enabling men and women to have a more human view of their fellow passengers.

### ***Now Try This:***

1. What is a common view of scientific achievements?
2. How, in the author's opinion, should people take the advances in science?

## **Seeking Answers**

Science is a way of seeking answers to questions about natural phenomena, and it will be far easier for the student to understand the answers if he is aware that there is a question. This suggestion may seem too obvious to be mentioned but recall some of the lec-

tures you may have heard recently. Did you always know why the research had been done? Was it clear what problems were being illuminated by the data presented?

*Now Try This:*

1. Why does the author start with the trivial statement?
2. How does the author define science?
3. What answers would you give to the author?

### **Elitist Education? Why Not?**

There seems to be a gnawing feeling among those concerned with higher education that our problem is not so much what we teach but how we teach. The strategy suggested here is that we should reduce the factual load and give greater attention to the conceptual framework of the field. It is surely true that students can learn far more than they understand, but to what purpose? There are difficulties with the suggested approach. It is far harder to teach concepts than facts and most of our students' prior education will have dealt more with facts than ideas. Concern for ideas does sound elitist but we simply have to accept that higher education is elitist enterprise. The style for education must be set for those who wish to learn and understand and not for those unable and unwilling to do so. The enjoyment of ideas, like the enjoyment of beer, seems to be an acquired characteristic — and not everyone likes beer.

*Now Try This:*

1. What strategy does the author suggest here?
2. Are there difficulties in realising it?

## **МОДАЛЬНІ ДІЄСЛОВА**

### **1. Перекладіть речення:**

*a) визначте план модального дієслова.*

1. One does not need to be a sociolinguist to sense that the way people talk has something to do with their social position or level of education.

2. Language can be a barrier to communication; some errors in translation can provoke a diplomatic incident.

3. Doubtless, a certain amount of change could be introduced into the project without harm.

4. Communication problems must happen thousands of times each day in tourism, business, research, politics, etc.

5. Within the pages of a daily paper there will be such diverse categories as news reports, TV programme, descriptions, sport results, crossword clues and a lot of other things.

6. In a comprehensive English dictionary, the vast majority of words would be scientific and technological terms.

7. There is a class of experiences we should all have had before death if we wish to claim to have lived fully.

8. Increasing evidence suggests that diets rich in fruits and vegetables could have a protective effect against a number of cancers.

9. This situation may not remain true for ever.

10. The country should be poor in natural resources and have weak management since its economic development is rather slow. There should also be problems in the educational system.

11. To stay competitive, manufacturers must redesign their products.

12. Even the best intentioned genetic engineering can have bad effects.

*б) підберіть потрібні модальні дієслова для перекладу речень. Поясніть свій вибір:*

1. Людство мусить пам'ятати, що природні запаси вичерпні і їх треба берегти.

2. Наука повинна слугувати прогресу.

3. Молодий вчений мусить цікавитися життєвим подвигом великих.

4. Для того, щоб бути в курсі розвитку науки, вчений повинен постійно читати.

5. Ви маєте записувати свої думки, що виникають під час роботи над науковою літературою.

**2. Виберіть: а) необхідний лексичний еквівалент, б) потрібне модальне дієслово для позначення припущення в те-**

**перішньому часі. Зверніть увагу на їхні еквіваленти в українській мові.**

**а)**

1. Людство, напевно, забуло про те, що життя на землі не закінчується сьогодні.

2. Імовірно, наука буде здатною зупинити сповзання людства в безодню.

3. Скоріше за все, ХХІ століття стане свідком нових геологічних катаклізмів. І в кожному з них людина обов'язково братиме участь.

4. Безумовно, наша цивілізація увібрала в себе все передове своїх попередників.

5. Експеримент, напевно, залишиться одним із способів підтвердження теорії.

6. Доповідач може помилятися у висновках, оскільки запропонована концепція, як мені здається, наводить на інші думки.

7. Природно, кожний вчений завжди прагне знайти істину.

8. Напевно, завжди можна поставити питання, проте не завжди на нього можна отримати відповідь.

9. Такий підхід неминуче призведе до серйозних помилок.

**б)**

1. Молодий учений може помилятися, однак не мусить нехтувати можливістю дізнатися про нове.

2. Результати руйнівної діяльності людини можуть зупинити її, але можуть і згубити.

3. Багато з того, що вже зруйновано, ми не здатні відновити.

4. Людина може довго прожити без їжі, проте їй не можна тривалий час лишатися без води.

5. Якщо ви хочете вступити до аспірантури, вам потрібно скласти/ви мусите скласти вступні іспити.

6. Зрозуміло, що кожне відкриття тягне за собою безліч інших.

7. Потрібно добре знати свою галузь дослідження, щоб бути здатним передбачати шляхи її розвитку.

8. Необхідні величезні витрати, щоб якоюсь мірою компенсувати деградацію довкілля.

9. Вчений мусить представляти собі проблему, яка його цікавить, загалом інакше він не зможе знайти шляхи її вирішення.



**3. Перекладіть речення/судження автора стосовно подій у минулому, а) використовуючи лексичні елементи *probably, possibly, perhaps, naturally, evidently, obviously, to be sure, it is certain, undoubtedly, there is no doubt, inevitably*:**

1. Він, напевно, не взяв до уваги всі фактори ризику.
2. Вам, напевно/мабуть слід було зміни термін завершення програми.
3. Йому, мабуть/напевно, вдалося дістатися до сутності явищ.
4. Вони, природно, виконали випробування за прийнятим планом.

**б) використовуючи модальні дієслова *must, will, would, may, can, could, should, to be, to have*:**

1. Людство, напевно, вже досягло такої стадії свого розвитку, коли подальший прогрес веде до його загибелі.
2. Напевно/мабуть молоде покоління сьогодні твердо усвідомило необхідність фахових знань.
3. Цілком ймовірно, що нашу планету було створено іншими цивілізаціями.
4. Безумовно, еволюційна біологія як наука пройшла величезний шлях.

**4. Перекладіть, дібравши еквіваленти із запропонованих списків слів.**

**а) Напевно, мусить, мабуть, непогано було б, імовірно, скоріше за все, вимушені, необхідно.**

1. The first suggestion is to be treated seriously.
2. There must be another approach to this problem.
3. The amount of data on the problem can be unlimited.
4. Teachers should learn to recognise their drawbacks.
5. Science is done by human beings, so mistakes may occur.
6. There cannot be answers unless there are questions.
7. The results won't meet the requirements, so we will go another way.
8. We will have to change the priorities in our work.
9. One must be critical of oneself.

**б) Потрібно, необхідно, слід, потрібно, можливо, напевно, ймовірно, може бути, вимушений, безумовно.**

1. It is to be emphasised that...
2. One should mention that...
3. Consideration must be given to...
4. It may be useful to note that...
5. One may not find it rewarding...
6. It may seem appropriate to say that...
7. It might be too daring to suggest (that)...
8. Attention is to be paid to the fact that...
9. One might feel that...
10. It is to be recognised that...
11. It will be important to mention that...
12. One has to admit that...

**5. Виберіть речення, в яких явно виражене ставлення автора до висловлювання. В яких із них воно більш/менш категоричне? Поясніть свій вибір. Перекладіть.**

1. Although the method looked good on paper, no one but the enthusiasts could get it to work.

2. According to some estimates, the results would represent a success rate as much as five times that of the standard method.

3. It is realised that the method could cut costs and increase production.

4. History might not repeat itself but sometimes it comes fairly close.

5. There is the risk of creating a new system that might lead to better results, but also might lead to failure.

6. The premature announcement of the discovery would be a public-relations disaster, leading to low funding and forever broken confidence in science.

7. He may not be a physicist, but he knows what matters.

8. There is strong evidence that his progressive ideas will have made their way to certain countries.

9. Researchers relying on these unchecked figures will have to rethink their work.

10. The edifice of misinformation keeps growing, and this should provide food for thought.

11. The supposed stone tools may have been just naturally shaped stones.

12. This discovery will make all stop with wonder at our planet.

13. According to the ancient texts, the town must have flourished 4,000 years ago.

14. Dispersing the oil through a huge volume of water should lower its toxicity, just as diluting a poison reduces its effect.

15. A good navigator must always be ready to change course when he finds the map wrong.

16. The questions at the end of each chapter should provide reflection and stimulate discussion.

17. It is not clear how such animals could have survived in such unlikely settings.

18. Comets must be rich in organic matter, probably including amino acids.

19. Knowing about this secret might change the way of thinking.

20. Success with the method raised hopes that AIDS would be treatable.

## **ON YOUR OWN**

### **Scientific Guessing**

One cannot begin to make observations or conduct experiments with a question. One must start with a provisional answer — a testable hypothesis — if there is to be any hope of gaining some understanding of the phenomenon.

In science, we might almost say that we seek answers to answers. We cannot just ask why there is incredible variety in the world of life. We have to make a guess — hypothesis — for what the reason might be and then set about seeing if it is so.

#### **Now Try This:**

1. What is "to make a guess" in science?
2. What is the first step to make to be able to understand a phenomenon?

### **Soviet Sputnik and American Education**

The history of American science education is one of lurching from crisis to catastrophe. In the late 1950's the Soviet Union did American education a great favour by launching Sputnik before our own space efforts were off the ground.

It is not quite fair, however, to indicate that the entire educational reform movement of the 60's was a direct result of the Soviet Sputnik. Prior to that time there had been periodic concerns about the quality of American education in science and mathematics. Sputnik may have accelerated this concern but already in pre-Sputnik days, work was being done to alleviate it.

*Now Try This:*

1. What is the effect of Soviet space efforts on American education?
2. Can we consider Sputnik as the only factor that stimulated the American educational movement in the 60's?

### **Chances for Survival**

The French biologist Jacques Monod entitled his book "Chance and Necessity" (1971). By this he meant that our evolution to the stage of Homo Sapiens was based on chance mutations that were selected if they were necessary for the survival of our ancestral populations. Darwin would have approved of this title.

For three and a half million years the course of life has been guided by chance and necessity. But human beings have purposely altered the evolution of some species of plants and animals by changing "the necessity". Necessity was no longer defined as "necessary for the organism" but "necessary for mankind". In addition, we have altered the evolution of many other species by our modification of the environment, which might one day threaten our survival.

*Now Try This:*

1. Why does the author mention Darwin here?
2. How does Homo Sapiens change his habitat?

### **Symptoms Say Nothing**

AIDS stands for acquired immunodeficiency syndrome. It is a disease caused by the human immunodeficiency virus (HIV). The AIDS virus may live in the human body for years and can be spread to others before any symptoms appear. It primarily effects you by making your body unable to fight diseases and infections. These diseases and infections can kill you.

It is important to understand that people infected with the AIDS virus usually look and feel healthy and may not even know for many years that they are infected. When symptoms do appear, they can be like those of many common illnesses. Only a doctor and a blood test can tell if someone is infected with the AIDS virus.

At present AIDS cannot be cured. Scientists expect that, if it is even possible, finding a vaccine or cure will take many more years of research.

*Now Try This:*

1. How is the virus described in the text?
2. How can the virus be detected in an organism?
3. What is the prognosis for the future concerning AIDS?

### **Brilliant Perspectives**

One cannot overemphasise the importance of genetic engineering for our future welfare. Many things are possible now and, at the current rate of progress, nothing seems theoretically impossible to accomplish. Therefore, we will be in a position to make decisions about ourselves and other forms of life never possible before. These decisions will deeply involve questions of ethics and the well-being of mankind and other forms of life. Decisions will be made and they must be made by informed minds.

*Now Try This:*

1. Could you interpret the last sentence?

### **Common Ancestry**

The view of the influential British anatomist Elliot Smith that a large brain appeared first in humans started a theory that creatures with big brains and ape-like bodies would signal the beginning of mankind.

Before the turn of the century the famous German biologist Ernst Haeckel stressed that both bipedal walking and the appearance of language must have characterised the earliest hominids. He suggested that man must have arisen in the great plateau of Central Asia. The rising Himalayas causing increasing aridity to the north would have reduced the forests to savannah and forced apes from the trees to become ape men.

### *Now Try This:*

1. How are the earliest hominids characterised in the text?
2. What factors stimulated the appearance of ape-men?
3. Can you decide which of the hypotheses given here are the least tentative? What words helped you to decide?

### **Responsibility**

Most scientists agree that scientific misconduct falls into two categories: fraud, a rare event but well publicised when discovered, and negligence, which is far more common. The problem of wilful fraud in science probably has no simpler solution than that already evident: intellectual curiosity and open debate. Negligence is a more difficult problem, for which there is also a simple solution: scientific journal should require a "responsible author" (RA) for each manuscript. This person would assume responsibility for the methods and results described in the published article and, should there be misconduct by any of the authors, the RA would be culpable.

### *Now Try This:*

1. Which of the two cases of misconduct does the author consider more serious? How does he explain it?
2. Does he offer solutions to the problem? Say which.

### **Not a Distant Past**

Today, mainly because of recent discoveries, we know several points of greatest significance about our origin. Studies of late and early modern Homo Sapiens show that much of what we hold "near and dear" about ourselves — our very anatomical proportions, our ability to create art and symbols, sophisticated tool manufacture, and construction and use of house and home may have appeared only a few tens of thousands of years ago.

### *Now Try This:*

1. What hypothesis is suggested here? What indicates that it is a hypothesis?

## УМОВНИЙ СПОСІБ ДІЄСЛОВА

### 1. Перекладіть речення українською/російською.

а) Починаючи з безособової конструкції (*it is/would be important that..., it is of importance that..., it is/might be of certain interest for smb. that, it is inevitable that..., it is useful that..., it is of certain use that..., etc.*). В яких із них присудок буде перекладений умовним способом? Чому?

1. Важливо, що наші пропозиції схвалені.
2. Важливо, щоб наші пропозиції було схвалено.
3. Цікаво, що в США до 1960 року слово "еволюція" навіть не згадувалося у шкільних підручниках з біології.
4. Фірма дуже зацікавлена (висловлює велику зацікавленість) у тому, щоб її співробітники могли проходити щорічну професійну перепідготовку.
5. Витрати на навчання фахівців у цій галузі слід збільшити.
6. Нам не уникнути того, що природні ресурси врешті решт будуть не здатні забезпечити життєдіяльність людини.
7. Корисно, що людство бачить підтвердження цьому вже зараз.
8. Певну користь принесли б нашому студентству постійні контакти з їхніми однолітками за кордоном.

б) Використовуючи дієслова, словосполучення та сполучники, після яких вживається умовний спосіб.

1. Професор із Франції запропонував відкласти обговорення на наступний день (щоб обговорення було відкладено).
2. Він вважає, що застосування даного підходу дає позитивні результати.
3. Група експертів висловила застереження, що не буде здатна вирішити поставлену задачу у визначений термін.
4. Наукова громадскість занепокоєна тим, що проблема СНІДу може вийти на рівень світових проблем (аби вона не стала світовою).
5. Вчені мусять прийти до університетів, щоб молоде покоління дослідників могло перейняти їхній досвід.

2. Яку роль виконує *should* у поданих реченнях? Виберіть речення без *should*, зверніть увагу на форму присудка у

підрядному реченні. Замініть їх, використавши *should*, та перекладіть. Чи є різниця у змісті між даними реченнями та вашим варіантом?

1. There are fears lest it should take years to rebuild the crippled data base.

2. It is believed that it is of utmost importance that as many people as possible should know at least one foreign language.

3. There is a danger that the error become established if such a practice is generally adopted.

4. If the activity is to continue it is highly desirable that the participants should show their interest.

5. The important thing today is that barriers be broken down and confidence built up.

6. To work efficiently in this field it is necessary that one know and use the world wide language, English.

7. It is natural that students should forget what they heard and understood.

8. Of course, we would like that our children should live a happy and prosperous life.

9. It does not seem appropriate that one separate special cases from general ones.

10. It was suggested that a young researcher be given practice in relying on his own resources.

11. The educators suggest that our schools face up to the world as it is today and prepare our young people to do something in it and about it.

12. Publishers would like that a paper be well organised and typed.

13. They would wish that this book go far and be a help to many.

14. Knowledge of a foreign language broadens opportunities of work in all fields, be it science, technology, mass media, etc.

## **ON YOUR OWN**

### **Monsters in the Basement**

We must discontinue teaching science as if it were a self-contained discipline, a discipline existing of, by, and for itself. Instead, we must begin to understand and communicate the relationships



between science, technology and society. We must acquaint students with the applications of science to their everyday lives. We must refute the image of a scientist as one who makes monsters in the basement or unleashes deadly radiation or chemicals upon an unsuspecting population.

*Now Try This:*

1. How do we teach science today?
2. What alternative approach does the author suggest?
3. What is a popular view of a scientist as described in the text?

### **Computer at School**

Familiarity with computers is now part of everyone's literacy. The initiative to get at least one computer into every UK school ought now to be followed by the more ambitious demand that no student qualify from an HE institution without being computer competent.

*Now Try This:*

1. What are the stages of introducing computers into UK schools?

### **Holes in the Sky**

The ozone hole demonstrates that processes generally considered unimportant in computer simulation can indeed appear to have serious consequences in the real world. The fact that we cannot prove that the warming during the last century was caused by man-induced greenhouse gases is not the major issue. Rather the issue is that, by adding infrared-absorbing gases to the atmosphere, we are effectively playing Russian roulette with our climate. It is essential that a proper course of action be planned lest the consequences should prove detrimental to agriculture and wildlife.

*Now Try This:*

1. What strategy does the author suggest?
2. In what case should it be used?

### **Science Is a Way of Knowing**

In spite of the difficulties, we must change the way we do our teaching — for the health of the nation, the welfare of our students,

and our own satisfaction. It is terribly important that these changes be made and it will be terribly difficult to do so.

It is highly desirable that teaching should return to a place of distinction and reward in the universities. This need not result in damage to research programs.

Good teaching and good research are not incompatible. Indeed, ideally they should be synergistic.

Educational reform for a viable future for our nation and for its citizens must begin with us. We must help students to acquire a deep understanding of the nature of science and its strength and limitations. This goal is equally important for all — be it those who plan a career in science, become teachers of science in the schools or make the informed decisions of a democracy.

There is a strong demand in the society today that a course in science should be an intellectual adventure. Remember — what is known is ephemeral. Science as a way of knowing is forever.

*Now Try This:*

1. What is an important task in science education?
2. What is the position of science in the universities now?
3. What should be done to change the situation?
4. How does the author understand the purpose of an educational reform?

## ПАСИВНІ КОНСТРУКЦІЇ

### 1. Перекладіть речення:

*а) у активному та пасивному стані. Використовуйте підкреслені елементи в якості підмета пасивного речення, а висловлювання, подані у дужках, — для присудка. Чи є різниця на рівні змісту між двома варіантами перекладу?*

1 Наша робота отримала схвалення колег/була схвалена колегами (to approve of).

2. Він отримав безліч привітань з новим призначенням від своїх друзів (to congratulate smb. on smth.).

3. Лабораторія розробляє оригінальну методику проведення досліджень (to work out).

4. Вчений запропонував цікавий підхід до розв'язання такого типу задач (to suggest).

5. Науковий центр розмістив велику кількість новітнього обладнання (to install).

6. Запрошені фахівці провели низку семінарів та інших зустрічей (to hold a meeting/seminar).

7. Стаття розглядає даний феномен детально (to treat).

8. Доповідач детально зупинився на перевагах новітніх методик (to approach).

*б) використовуючи у ролі підмета підкреслені слова. Який граматичний стан присудка ви оберете для перекладу?*

1. У лабораторії відкрито новий засіб боротьби з цим захворюванням.

2. У статті аналізуються протилежні точки зору.

3. У науковому центрі проводять випробування нового препарата.

4. У доповіді були зазначені головні причини невдачі.

5. В останніх публікаціях не згадуються ці факти.

## **2. Перекладіть.**

*а) Зверніть увагу на роль артикля (нульовий, неозначений, означений) при підметі. З чого ви почнете українське речення — з іменника чи з іншої частини мови?*

1. An idea was suggested to modify the technique.

2. An approach was used that helped to construct an adequate theory.

3. Evidence was obtained that ruins the underlying concept.

4. Information was received that the technique has a damaging effect.

*б) У яких реченнях підмет в англійському реченні буде мати неозначений або нульовий артикль?*

1. Було підготовлено повідомлення про цікаве відкриття.

2. Опубліковано дані про те, що нові ліки ефективні й при інших захворюваннях.

3. Було розроблено план підготовки фахівців даного профілю.

4. Під час дослідження було отримано дані, які допомогли у подальшій розробці проблеми.

5. На конференції було прочитано доповідь, значення якої важко переоцінити.

6. Повідомлення про це відкриття було підготовлено нашою лабораторією.

7. Нові дані про це явище виявилися неперевіреними.

8. Інформацію про міжнародну зустріч буде надано пізніше.

9. Інтерес, що його виявили молоді фізики до цього явища, широко коментували у пресі.

10. Нові ідеї сприймаються не відразу.

11. Виникненню/появі такого підхода сприяла творча атмосфера в лабораторії.

12. У наступному номері журналу буде проаналізовано різні точки зору з цього питання.

### 3. Трансформуйте речення:

а) використовуючи безособові конструкції (*it is suggested, it was recognised, it has been understood, it is said* тощо).

1. They suggested that the method be widely used.

2. Scientists recognise that their discoveries may have bad effect on man.

3. People understand that nuclear energy is a gene in a bottle.

4. They say that our universe is inhabited by humanlike creatures.

б) використовуючи прислівники *commonly, universally, widely, generally, strongly*.

1. Наразі посилено провадиться думка про те, що...

2. Загально прийнято, що..

3. Побутує думка, що...

4. В практиці досліджень визнають, що...

5. Слід зазначити, що...

6. Хотілося б підкреслити, що...

7. Слід повторити, що...

8. Існує думка, що...

### 4. Перекладіть.

а) Зверніть увагу на відмінок, в якому в українській мові стоїтиме підмет англійського речення. В яких реченнях можливі варіанти перекладу?

1. He was asked for advice.

2. Minor mistakes were neglected.
3. They were given the last chance.
4. The public was misinformed about the new project.
5. The phenomenon was given the name of "ozone holes".
6. Great enthusiasm was shown during the test which proved the urgency of the problem.
7. An approach was suggested which simplified the procedure.
8. No alternatives to the method were discussed at the meeting.
9. The research teams were staffed and equipped to remain in the first international rank.
10. Students' needs and objectives will be effectively met by a new system of higher education.

*б) У яких реченнях зручніше починати український переклад з прийменника?*

1. The proposals were objected to by a number of conservatives.
2. New data were referred to in recent publications.
3. Old machines can no longer be relied upon in modern experiments.
4. A model is agreed upon which will be used in the next series of experiments.
5. The hypothesis on which the approach is based will be dealt with in the report of Dr. Kern.
6. The concepts that seemed meaningful and correct were subjected to severe criticism.

*в) Зверніть увагу на відсутність прийменника при дієслові в українській мові.*

1. The progress of investigation was commented upon with approval by the head of the centre.
2. The conditions under which the equipment can be relied upon are dealt with in detail in the agreement.
3. The dramatic changes in industry were brought about by managers with high-level general education.
4. The most curious reader is referred to printed copies of an insightful essay on the subject.
5. An experimenter with great experience is referred to the list below of various possible uses of the technique.
6. Familiarity with computers is now generally referred to as computer competence.

7. A significant success of their research is accounted for by the computer competence they achieved.

8. Market costs are allowed for in the estimates of the lab's current needs.

г) *Зауважте, що англійському дієслову відповідає дієслово з прийменником в українській мові.*

1. The experiment was affected by an unexpected failure of the equipment.

2. Fundamental research today is greatly influenced by market.

3. Training places are joined now by those who wish to relate theoretical learning to the world practice.

4. Courses that are attended by students in summer at this centre are free.

5. The Council's director was approached for an interview.

6. Recent achievements of the firm were approached from the viewpoint of their application rather than their fundamental significance.

7. The company's letter was answered with slight delay.

**5. Зверніть увагу на те, що деякі дієслова є багатозначними (див. ч. I), наприклад:**

**Follow:** 1. йти за. 2. застосовувати, використовувати. 3. слідкувати, відслідковувати.

а) *Визначте підмет у наступних реченнях:*

1. За морозною зимою прийшла рання весна.

2. За нашими прорахунками завжди йде смуга невдач.

3. Після виступу цього відомого дослідника Півночі до редакції приходять безліч листів.

4. За накресленою програмою, після засідання відбудеться обговорення в групах.

5. Згідно з домовленістю, після стажування у центрі наукових досліджень йде робота з систематизації результатів.

б) *Перекладіть речення, використовуючи активний стан дієслова to follow. Зверніть увагу на місце підмета і додатка в українській та англійській мовах.*

1. За багатьма дослідженнями в галузі теорії йшла копітка експериментальна робота.

2. Хвороба почалася після нетривалого перебування в небезпечній зоні.

3. Підйом в економіці (economic boost) почався після великих капіталовкладень у цю сферу.

в) *Перекладіть, звертаючи увагу на те, яким членом англійського речення у пасивному стані передається підмет українського речення. Який стан слід використати при перекладі речень в (а)?*

1. За підйомом відбувся великий спад (a decline).

2. Після гарячих дебатів настав період ретельних досліджень.

3. Після загального ухвалення проекту почалася тривала робота з його впровадження.

4. За кожним відкриттям тягнеться довгий ланцюг запитань-загадок.

г) *Перекладіть, зважаючи на багатозначність дієслова to follow.*

1. The procedure has been followed by a majority of researchers.

2. Young scientists should closely follow the developments in their fields.

3. The discovery of the phenomenon was followed by a number of publications.

4. The movements of stars can be followed by large telescopes.

5. New information on the problem will follow.

6. The concept of the approach is as follows.

**6. Перекладіть, визначивши, за яким принципом було побудоване англійське пасивне речення, де підмет:**

а) слово сталого дієслівного словосполучення типу *to make use of*;

б) додаток речення.

**Назвіть присудок англійського речення. Прочитайте, правильно інтонуючи логічні паузи.**

1. Attention was given to the new facts.

2. The country's fundamental research effort will be placed emphasis on in the government's report.

3. A simpler technique was made use of.

4. Account is taken in the article of the science's progress in future.

5. A new, simple and attractive scheme was given preference to.

6. Advantage has been taken of the education system that raises morals and builds confidence.

7. Immediate problems in the field have been made mention of at the gathering.

8. Use will be made of facilities that enable good research to develop.

**7. Перекладіть речення, спираючись на принципи а) та б) (де це можливо).**

1. Було відзначено/відзначалися великі досягнення в галузі прикладних наук.

2. Широке застосування у медицині отримали нові матеріали.

3. Згадувалися ранні праці вченого в цій галузі.

4. Особливо виділено у доповіді дослідження з практичного застосування моделі, що розглядається.

5. Було зроблено певні кроки з метою розширення розпочатих досліджень.

6. Особливу обережність слід виявляти під час роботи з хімічно активними речовинами.

**ON YOUR OWN**

**Every Nation Should Recognise its Talents**

This July 20 outstanding American citizens were awarded National Medals of Science and Technology. The presentation ceremony was attended by the families and friends of the medallists as well as media representatives. It should be mentioned that this event, however, did not receive such coverage by print media. This is unfortunate because it is individuals like these medallists who have discovered or invented many of the things taken for granted in our daily lives.

It should be emphasised that the discoveries made and honoured have kept millions of people alive, reduced suffering and opened up new frontiers for technology. In the remarks of those speaking at the ceremony attention was drawn to the fact that those were inventions that had made computers work better and faster and had introduced improvements into our weapons systems that had made the difference in our national security.



It is to be pointed out that, unfortunately, events like this, at which some of our leading scientists and engineers are honoured, are not generally regarded as news by most of the media. It is a deploring situation. There is today much concern with science and technology education and with the lack of interest shown by our children and young people in pursuing careers in science and technology. Many people admit that we no longer seem to produce the kinds of heroes and the real models for our young people to admire and follow as we used to.

Maybe it would help to inspire more young people and educate the public if there were a few more news stories about achievements of scientists and engineers who have saved millions of lives or changed the dynamics of the world economy as a result of a key scientific discovery or invention.

### *Now Try This:*

1. Do you think the following sentence is active or passive (not in form but in meaning) — "...this event, however, did not receive much coverage by print media"?
2. Find the words that help the author to stress and point out his ideas.
3. Find the instances where passive constructions are implicit. Make them explicit.

The following questions might help you:

- a) What discoveries does the author mean saying that they help to keep millions of people alive, reduced suffering and opened up new frontiers of technology?
- b) What concern does the society express?
- c) What, in the author's opinion, would inspire young people and educate the public?

### **Space Requirements**

How much living space does a person need? What happens when these space requirements are not adequately met? Sociologists and psychologists are conducting experiments on rats to determine the effects of overcrowding on humans. Recent studies have shown that the behaviour of rats is greatly affected by space. If rats have adequate living space, they eat well, sleep well, and reproduce well. But if their living conditions become too crowded, their behaviour patterns and even their health change perceptively. They cannot sleep

and eat well, and signs for fear and tension become obvious. The more crowded they are, the more they tend to bite each other and even kill each other. Thus, for rats, population and violence are directly related. Is this a natural law for human society as well? Is adequate space not only desirable but essential for human survival?

*Now Try This:*

1. What is the purpose of the experiments on rats?
2. What is the correlation between space and rats' behaviour?
3. What is compared in the sentence: "The more crowded they are..."?
3. What other correlation could you find in the text?

### **Terms Used in Science**

It is not enough to simply introduce and define such terms as "theory", "scientific method" and "hypothesis". They need be used. They need be constantly used throughout a science course. Every new conceptual scheme we deal with should provide students with the critical hypothesis on which it rests. Students should understand the data on which it is based. They should understand the credibility of its statements.

We must stop teaching science as packages of facts with which the students can retreat and be assured of truth into the future. The tentative nature of science should be discussed; otherwise we push students into a dangerous relativism when they find that the facts they have been provided with are no longer valid.

We know that the history of science is strewn with discarded theories that someone at one time held in high repute. We know that our facts change from time to time as we accumulate more information. Science is not dogmatic but forever changing and striving for further explanation of the natural world. That is a noble and contributory undertaking in contrast to the inflexible dogmatism.

*Now Try This:*

1. How is "relativism" explained in the text?
2. What opposite approach to science teaching is suggested by the author?
3. How can you prove that "science is not dogmatic"?

## Science and Students' Life

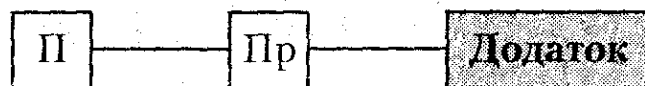
There is an important lesson to be learned: science, evidently, is not viewed by students as a way of reaching a deeper understanding of ourselves or of our environment. Science is not taken intuitively by the students. Science is, at best, a dry technical methodology, with its habits and close analysis. It is cold and impersonal. The study of science is alienated from the life of the student.

The agonising feature of science education today is the wide gulf between one's studies and one's life. The challenge of education in the sciences is to expose students to learning experiences that will make the scientific outlook part of their daily living. Changes in skills and judgements occur when the student lives through an event.

### Now Try This:

1. Why is it hard to teach science?
2. How does the author characterise science?
3. What is the way of successful science teaching?
4. What lesson to be learned does the author mention in the text?

## ДОДАТОК



### 1. Визначте додаток, звертаючи увагу на

*а) місце додатка в українських реченнях:*

1. Групу експертів зустрічали представники нового підприємства.
2. Сміливу ідею висунула лабораторія професора Х.
3. Вірний напрямок запропонували вчені-практики.
4. Людству загрожує не тільки економічна криза.
5. Кризу ідей в даній галузі констатувала комісія у своїй доповіді на симпозіумі.
6. Вченим було виконано велику роботу для доведення гіпотези.
7. Нові факти будуть перевірені та досліджені.

8. Про незвичайні явища в атмосфері йшлося на зустрічі фахівців.

9. Багато залежить від кругозору вченого.

*б) місце додатка в англійських реченнях:*

1. Scientists are interested in how principles and techniques of various fields could be used to understand the mechanism of the process.

2. Investigations of organism add to our understanding of evolution process.

3. The speaker explained why he had chosen natural selection as a topic for his current research.

4. He limited his comments to a few selected examples.

5. The approach shows where future investigation is still needed.

## **2. Визначте додаток у наступних реченнях.**

*а) Представте цю частину речення додатковим підрядним реченням. Початок речення подано в дужках.*

1. They expect the suggested method to apply in various fields of research. (They expect that...)

2. Scientists have found the atmosphere to be badly affected by man's activity. (Scientists have found that...)

3. The students know him to have skills necessary to guide and facilitate discussions. (The students know that...)

4. We hope this technique to be of practical use for beginners. (We hope that...)

*б) Яке значення виражає інфінітив у групі додатка?*

1. We know these hypotheses to have been refuted. (We know that...)

2. One believes the industrial revolution to have altered the character of the countryside. (One believes that...)

3. They hold him to have developed an original approach to the problem in question. (They hold that...)

4. The participants find the meeting to have been carefully planned. (The participants find that...)

5. The group members consider the dramatic changes in the environment to have been provoked by irrational exploitation of land. (The group members consider that...)

**3. Дайте відповідь на запитання в дужках, пропонуючи тільки основну інформацію.**

*E. g.: Personal contacts enable the participants to freely exchange their opinions. (What is the benefit of personal contacts at a meeting?)*

— *That participants (can) freely exchange their opinions.*

1. The new techniques allow a universal model to be applied here. (What does the technique allow?)

2. The doctor allowed the man to sit up in bed. (What was the doctor's permission?)

3. The recent observations allow an experienced worker to construct a feasible hypothesis. (What do the recent observations allow?)

4. She allowed the mixture to stay overnight. (What did she allow?)

5. Co-operation forces new forms of work to come into being. (What does co-operation stimulate?)

6. Passive learning causes passive believing to be the students' attitude in education. (What is the result of passive learning?)

7. The situation requires traditional views to be changed. (What should be done?)

8. Exceptionally challenging problems make a researcher perform better. (Why are challenging problems so good in research activity?)

**4. Виділіть S+V + N + (as) Adj/Ved<sub>3</sub>/Ving/N модель та перекладіть речення.**

1. We take the analysis as clearing the nature of the process.

2. Experts consider the tests done accurately and efficiently.

3. The researcher found his results as proving the evidence.

4. The students see the problem as challenging and stimulating research.

5. The observed facts show the hypothesis as consistent and plausible.

6. The evidence proves the process as having been initiated by temperature variations.

7. Scientists hold the book as having been excellently reviewed and commented on.

8. They take the process as autonomous and of little importance for the problem in question.

9. They found the phenomenon analysed and supported by newly obtained evidence.

**5. Перекладіть речення використовуючи модель S + V + N + Inf.**

1. Сьогодні кожен розуміє, що життя на Землі у небезпеці.
2. Щодня ми можемо спостерігати, як людина знищує місце свого проживання.
3. Наука дає змогу людині пізнати саму себе.
4. Хороший учитель знає, що оригінальна проблема зацікавить навіть найбайдужіших.
5. Ми хочемо, щоб наукові відкриття йшли на користь людству.
6. Науковий пошук вимагає, щоб науковець володів величезними знаннями та інтуїцією дослідника. Тоді можна сподіватися, що природа відкриє деякі із своїх таємниць.
7. Лікарі вважають, що холодна вода має позитивний вплив на організм людини.

**6. Перекладіть, звертаючи увагу на час присудка підрядного речення.**

1. Всім відомо, що наші помилки у минулому уповільнили розвиток таких наук, як генетика та кібернетика.
2. Учені вважають, що аварія на Чорнобильській АЕС завдала непоправної шкоди всьому живому в країні.
3. Провідні фахівці вважають, що зміни в структурі речовини були спричинені явищами позаземного походження.
4. Його колеги вважають, що він пройшов прекрасну школу у цього професора.
5. Біологи вважають, що відкриття гена прояснило багато проблем, пов'язаних з людським організмом.

**7. Визначте групу додатка в наступних реченнях.**

1. Try to avoid personal remarks in discussions.
2. We cannot avoid making mistakes.
3. Scientists started a new campaign against the epidemic.
4. They started investigating the causes of the disease.
5. A young researcher always thinks of his scientific career.

6. They think of finding solution to seemingly insoluble problems.
7. He is interested in doing his work well.
8. He relies on his talent and chance helping him in his professional life.

**8. Визначте суб'єкт *Ving*-зворота. Чи завжди він виконує дію, виражену *Ving*? Перекладіть.**

1. They object to taking part in the experiments that are dangerous to man.
2. Scientists insist on their discoveries being used for the well-being of man.
3. Noble inventions may keep man from doing wrong.
4. Engineers rely on the firm giving them opportunities to build their own careers.
5. His coordinating efforts resulted in the research team sharing common enthusiasm and preferring similar methods of working together.
6. The young researcher succeeded in obtaining new and striking evidence to his hypothesis.
7. A good supervisor is interested in encouraging and stimulating his pupils.
8. The investigator insisted on the new technique being more effective than the existing ones.
9. The analysis is correct due to the researcher employing up-to-date techniques.
10. The observation suggested good agreement with computational data in addition to demonstrating some new evidence.
11. The experimenter performs well owing to his tools being highly effective.

**9. Дайте відповіді на запитання в дужках, пропонуючи тільки головну інформацію.**

*E. g.: The newly obtained data accounts for the previous conclusions being incorrect. (What fact became clear after the new data were obtained?) — The previous conclusions are incorrect.*

1. The two approaches are alike in taking pressure as the main factor of the relationship. (What is the point of similarity between the two approaches?)

2. These methods rely on a scientist employing sophisticated equipment. (In which case will the method work?)
3. The success of the investigation depends on the incorporation of molecular biology techniques proving its usefulness. (What is the main condition for success?)
4. In addition to being original the solution is unique. (What are the two characteristics of the solution?)
5. They adopted the method because of the performance of the investigator increasing considerably. (What is the reason for adopting the method?)
6. The idea can be easily understood due to being explicitly formulated. (What makes the idea easy to understand?)
7. The history of these studies is well known owing to the access to the documents becoming free. (Why is the history well known?)

## **ON YOUR OWN**

### **Do you Need Extra Vitamins?**

Vitamins and minerals are essential for good health. A varied, balanced diet usually supplies a full complement of all the nutrients you need. Vitamin deficiencies rarely occur in the United States, but some people still worry about deficiencies and believe that they will be healthier if they take extra vitamins. Other people feel that extra vitamins are effective in curing and preventing diseases. What can happen if you take large amounts of vitamins?

In most cases, vitamins are absorbed in the correct proportions and the rest leave the body. However, vitamins A and D remain in the fatty tissue and can result in vitamin poisoning.

The full effect of vitamins on the body has not been determined, and some experts question whether we need to fortify ourselves with extra vitamins.

*Now try this:*

1. Say if the second sentence is simple or complex. If complex, find the clause.
2. Why vitamins are generally considered useful?
3. What is the consequence of overdosing some of them?
4. What doubts do some experts express about vitamins?



## **Grandparents and Grandchildren?**

Who need grandparents? Children do. And their grandparents need them. Recent studies indicate that grandparents and grandchildren are better off when they spend a large amount of time together. What is the reason for this? Grandparents give to the children lots of affection with no strings attached, and the children make the grandparents feel loved and needed at a time when society may be telling the older people that they are a burden. Grandparents are a source of strength and wisdom and help ease the pressures between children and their parents.

*Now try this:*

1. Put a question to the subject of the second sentence.
2. Decide if the last sentence is complex or simple. Find all predicates in it.
3. Why do grandparents need children? Find the infinitive in the sentence "Grandparents give to the children lots of affection..."

## **Price of Sharing**

The uncertain economic conditions of recent years have caused union and management representatives to explore many ways of handling labour problems. Workers have always wanted to share in the profits when the company has good times. Now management representatives are saying, "We'll share the profits with you, if you share the losses with us".

Workers are having to decide whether they are willing to take the chance of salary and benefit cuts in the bad times. They are having to decide whether job security is more important than other benefits. In effect, they are having to decide whether they are willing and able to pay the cost of sharing.

*Now try this:*

1. What is the result of the uncertain economic conditions in the country?
2. What decisions do the workers have to make?

## **Heaven Can Wait a While**

Cryonics, the attempted preservation of human life by storing bodies at subfreezing temperatures, had a minor vogue in the self-

centred '70s, and the American Cryonics Society claims a current membership of 100 people who have committed themselves to being frozen after death. Reliable sources report the remains of about 15 people to be on ice at three storage centres in California and Michigan. The price for the promise of coming back to the 21st century can be as high as 125,000 dollars.

Cryonics is not to be confused with cryobiology, a recognised branch of medical research that studies the effects of very low temperatures on living tissue. Advances in this field now allow blood, corneas, bone marrow, sperm and even embryos to be frozen for use at a later date.

But so far, cryobiologists have been unable to make use of frozen organs such as pancreas, kidneys or heart in transplant surgery. There is no scientific basis on which to say anyone can be frozen and then reanimated. That is why scientists dismiss the claims of the body freezers.

*Now try this:*

1. How does cryonics differ from cryobiology?
2. Who are the members of the American Cryonics Society?
3. What do we learn from "reliable sources"?
4. What do they pay 125,000 dollars for?
5. What are the achievements in the fields of cryobiology?
6. What is the idea that lacks scientific basis?
7. Does the title of the text reflect the real state of things?

### **In Search of the Plastic Potato**

Researchers are now experimenting with ways to grow plastics instead of manufacturing them. Some scientists even dream of putting genes for plastic production into food crops. In this fantasy, the farmers of tomorrow will raise polyesters right alongside potatoes.

To the researchers engaged in this plastics revolution, the greatest appeal of biopolymers lies in the scientific arena, where biologically produced polymers promise to open up a whole new area of study. With the enzymes of nature at their disposal, chemists say they will be able to exert an unprecedented amount of control over the structures of the materials they build, allowing them to custom design strange new types of plastics, rubber-like substances, and perhaps some materials unlike any ever seen before.

*Now try this:*

1. What is the idea of the innovation?
2. What are the dreams of some more daring scientists?
3. What are the prospects biologically produced polymers open up for science?
4. What do chemists promise if the studies turn out to be a success?

### **Towards Prosperity of the Nation**

Academics and businessmen alike believe that the UK's prosperity and vitality depend upon our rapidly becoming a more highly and broadly educated nation at every level and, that, in particular, the perspectives and skills associated with mathematics, science and technology must be central to that education. UK industry (which includes commerce and the whole range of services) will flourish best in that context since its future success and competitiveness depend on responding creatively to continually more sophisticated surroundings, whether in building its workforces, identifying markets, developing its products, structuring its own organisations, negotiating with governments or defining its responsibilities towards the community at large.

*Now try this:*

1. What do the UK's prosperity and vitality rest on?
2. What can guarantee bright future for the UK industry?

### **Science and Public**

Public understanding of science is appalling. The major contributor to society's ignorance of science has been our educational system. The inability of students to appreciate the scope, meaning and limitations of science reflects our conventional lecture-oriented curriculum with its emphasis on passive learning.

The student's traditional role is that of a passive note-taker, accumulator of factual information. What is urgently needed is an educational program in which the students become interested in actively knowing, rather than passively believing.

The use of problem-based learning provides a rich vehicle for making our students active participants in the learning process. One of the most effective ways of implementing program-based learning

is to reorganise the students in small discussion groups. The potential of small, carefully structured learning groups in higher education is to be realised.

*Now try this:*

1. What practical changes in education does the author suggest?
2. What advantage does problem-based learning give to students?

### **Human Observer of Natural Selection**

Even to this day the demonstration of natural selection remains difficult except in certain special situations. Darwin himself realised that the demonstration would be most difficult for he believed that "we see nothing of these slow changes in progress, until the hand of time has marked the long lapse of the ages...". And he felt sure that these ages were considerably greater than the life span of any human observer. So it would never be possible for a scientist to observe one species evolving into another.

*Now try this:*

1. What does a scientist have to observe to get the demonstration of natural selection?
2. What, in Darwin's view, would never be possible?

### **Dehumanising Force**

The vast majority of individuals in our society know little about science and do not seem embarrassed by being uninformed. Who is to blame for the ignorance of science displayed by the average citizen? One fashionable explanation is that the newspapers serve science badly. It is probably true that the treatment of science in the press is less than satisfactory, but this is obviously far from being a conclusive answer.

It is also true that the scientific advances in recent years have occurred so rapidly that most people cannot digest new discoveries rushing into their life.

The brisk output of new knowledge disturbs one's serenity. Indeed, the novel powers of modern science arouse suspicious concern. The real hazards of nuclear power and the greatly magnified risks of DNA research have undermined public confidence in sci-

ence. To many people, science has become a dehumanising force in our society.

*Now try this:*

1. What does not trouble American public about its scientific literacy?
2. How are people affected by the scientific advances in recent years?
3. Is the press the only factor that plays a part in the situation?

### **Science — a Way of Discovering**

Apart from explaining the existing data, the theory of evolution proved of great value in directing the course of research. All important theories in sciences have this dual role — to explain the data already on hand and suggest ways of acquiring additional information. Science is not only a way of knowing; it is also a way of discovering.

*Now try this:*

1. Why is the theory of evolution useful?

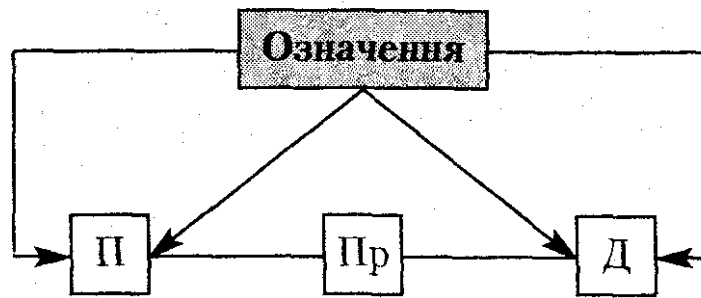
### **Useful Device**

Classification, often regarded as one of the duller parts of a science, is a device of utmost importance in enabling us to deal with everyday life. Classification consists in combining objects and ideas on the basis of some characteristics held in common. Classification is the most powerful method we possess for packaging information. It is so much a part of our lives that we forget how basic it is.

*Now try this:*

1. What is the general purpose of classification?
2. What can one do with the help of this powerful instrument in science?

## ОЗНАЧЕННЯ



**1. Визначте ключове слово у наступних словосполученнях. Поясніть їх значення.**

*E. g.: a reading lamp — a lamp that is used while reading;  
an ongoing project — a project that goes on, continues;*

1. disease producing organisms;
2. computer competency;
3. language skills;
4. quality science education;
5. secondary school biology tests;
6. research priorities;
7. research-based companies;
8. research and development managers;
9. decision-making experience;
10. information transfer;
11. education committee;
12. a genetics society.

**2. Визначте означення та присудок.**

1. The studies reviewed needed closer consideration.
2. The data predicted showed good agreement with the experimental evidence.
3. The approach demonstrated balanced views of the investigator on the subject discussed.
4. The number of drugs produced increased the danger of chemical poisoning.
5. The risk debated decreased in time.
6. The situation described predicted consequences of great significance.

**3. Перекладіть речення українською. Розгорніть означення *Ving*, *Ved<sub>3</sub>*, *Vinf* у підрядні речення, звертаючи увагу на граматичний час присудка підрядного речення.**

1. Most issues discussed revealed a growing interest in the subject.

2. Most issues to be discussed are of fundamental importance.

3. The first issue of the journal discussing the main points of the problem is available at the library.

4. The factors influencing man's activity are mainly those of culture and biology.

5. A scientist engaged his pupil in research and interesting him in it brings up his follower.

6. Scientists involved in peace movement are people of great will and wisdom.

7. People to be engaged in the project should show high intellectual potential.

8. The ideas defending evolution as a main concept of biology are valid at present.

9. The ideas defended at the conference meeting seemed quite new.

10. The ideas to be defended at the session are clearly presented in the paper.

**4. Згорніть підрядні речення в означення *Ving*, *Ved<sub>3</sub>*, *Vinf*.**

1. The speaker who emphasised the importance of genetic engineering for our future welfare sounded quite convincing.

2. Facts that throw light on the origin of man and his history are given close consideration to.

3. The scientific explanation that has been supplied by later research could be taken into consideration.

4. Useful accounts that were made by various authors on the problem were analysed and commented on.

5. The problem that is to be considered first is that of Man and Environment.

6. A public movement that will involve masses of people should be guided by informed minds.

7. The famous essay that made explicit the meaning of evolution for our history was written by T. H. Huxley in 1863.

8. An efficient solution to the problem that was provided by a first year student appeared to show originality of thinking.

9. The flow of information that clarifies the causes of the phenomenon has reached flood proportions.

10. The main points that must be debated at the conference which will be held in summer should be clearly identified.

**5. Визначте, хто виконує дію, виражену інфінітивом.**

1. The difference in properties for the researcher to establish is quite important.

2. The most practical course for university authorities to adopt is to give students an indication of the science further development.

3. The sorts of questions for the techniques of organic chemistry to answer are listed in the reference.

4. The pattern of development for the science to follow is clearly seen at present.

5. Other special cases of mutation for the investigator to consider are less well documented.

**6. Перекладіть,**

*а) використовуючи інфінітивний зворот:*

1. Донести до слухача саму природу описуваного явища — мета, досягти якої прагне кожен лектор.

2. Задача викладачів університетів — припинити розглядати науку як дещо, що існує само по собі і для себе. (Задача, яку слід виконати викладачам...)

3. Роль, яку медична громадськість має відігравати у пропаганді вакцинації дітей, важко переоцінити.

4. Питання, на яке вчений мусить відповісти, інколи буває важливішим за саму відповідь.

5. Тест, який має виконати той, хто складає іспит, звичайно не дає уявлення про рівень його мовної компетенції.

6. Стаття, яку фахівці знайдуть у науковому журналі, містить останні дані.

7. Гіпотеза, яку ці вчені збираються перевірити, була висунута 300 років тому.

*б) використовуючи зворот* : **N + V + Inf:**

1. Метод, який, як відомо, застосовували ще в минулому столітті, успішно використовується і в наш час.



2. Нова речовина, яка, як визначили, за властивостями є ідентичною речовинам, які вже застосовувалися раніше, виявилася більш економічною.

3. Експеримент, який, як констатують, пройшов успішно, буде обговорено на конференції.

4. Прилад, який напевно може бути використано в цьому експерименті, було розроблено порівняно нещодавно.

5. Доповідач торкнувся низки проблем, які, як вважають, можуть мати вирішальне значення для розвитку цієї галузі знань.

**7. Трансформуйте речення таким чином, щоб при інфінітивному означенні був свій суб'єкт — слова, подані в дужках.**

*E. g.: The data of the investigation to be compared were well documented (the experimenter). —> The data of the investigation for the experimenter to compare were well documented.*

1. The ways to follow in the molecular biology development have become practicable today (scientists).

2. The impacts to be made on our future are great (food, health, educational system).

3. The estimates to be discussed at the meeting are of certain interest (the research team).

4. The new discoveries to be understood are important and exciting (young researchers).

**8. Перекладіть, звертаючи увагу на граматичний час, котрим буде перекладатися інфінітив.**

1. Huxley was among the first to highlight evolution for a deeper understanding of biological development.

2. The famous geneticist H. J. Muller was the first to express concern that evolution was not taught properly in the schools.

3. It was the last meeting to hear this eminent scientist give a talk.

4. Special Symposium was the first of scientific gatherings of the last decade to identify the aspects of current research.

5. This attempt was the first to give meaning to the existing data.

6. In those days Darwinism was the first teaching to provide an explanatory hypothesis for the resemblances and the differences among organisms.

7. The lab of professor X. was the first to begin that far-going experiment.

8. This approach was the first in the field of practical application to offer results meeting the requirements of society.

9. These were the last words to be heard from that famous scientist and educator.

10. This was his last hypothesis to show the conceptual basis of the discovery.

### **9. Використайте інфінітивне означення.**

1. Роберт Бойль, один із перших, хто працював у даному напрямку, сформулював цей закон.

2. Одним із перших, хто висунув цілком сучасну теорію виникнення Всесвіту, був бельгійський священик Жорж Ламетр.

3. Він був одним із перших, хто вимагав опублікування цих наукових результатів.

4. Оскільки багато блискучих умів беруть участь у цьому дослідженні, неможливо передбачити, чий внесок буде головним і хто першим знайде рішення.

5. Люди племені, що зникло, були останніми, хто жив на цій рівнині до повені.

6. Цей вчений був першим, хто вказав на розбіжності між теорією та результатами експериментів.

7. Франція була першою країною, в якій у середні віки винайшли залізну підкову.

8. Заслуговує на увагу той факт, що саме біолог, Дарвін, першим запропонував майже правильну часову шкалу для датування геологічних подій.

### **10. Визначте слова, до яких відносяться *Ving*-звороти. Визначте суб'єкт *Ving*-зворота. Перекладіть.**

1. We should support in the minds of the general public the idea of science being the way of knowing.

2. Progressive minds support the educational concept of scientists becoming involved in education and participating in updating teachers.

3. They strongly objected to the idea of the bad science being able to generate valid hypotheses.

4. We cannot be sympathetic with the way of pseudo-sciences masquerading as science.

5. This way they avoid the possibility of minor mistakes affecting the general conclusions.

6. If a person works in isolation there is little chance of the individual's work becoming known.

7. Mankind today clearly sees the necessity of the relationship between science, society and technology being balanced and thoroughly comprehended.

8. This course of studies offers an opportunity of each student becoming an independent learner and a rational critical thinker.

### 11. Виконайте завдання.

а) Замініть групу означення підрядним реченням.

E. g.: There is a strong **necessity** of students realising the scope, meaning and limitations of sciences. —> There is a strong **necessity** that students (should) realise the scope, meaning and limitations of science.

1. The **ability** of the system being described in a number of different ways makes it the subject of controversy.

2. The **cause** of the disease spreading so rapidly is not clear yet.

3. The **probability** of obtaining the best results decreases in extreme situations.

4. The **probability** of the experiment giving the best results is small in extreme situations.

5. The **process** of water transferring from the sea to the land and back to the sea again is known as the hydrologic cycle.

6. There is **evidence** of certain types of stars, at certain stages of their lifetime, becoming unstable and throwing off large quantities of material.

7. The **necessity** of human beings participating in control operations brought to life human engineering, a science studying the relationship between the machine and its human operators.

б) Визначте, хто виконує дію, виражену Ving.

1. Our universities should assume a prominent role of enhancing the meaning of science.

2. He had a unique talent of finding and solving significant problems.

3. There is an opportunity of making your success known — by publications, seminars or personal dialogue.

4. After visiting this institution one has the feeling of being involved in its atmosphere of creativity and friendliness.

5. An important feature for scientist is the capacity of becoming absorbed in the problem-solving activity.

**12. Виділіть означальні зв'язки у наступних реченнях. Перекладіть.**

1. They appreciated the manner of commenting on additional findings, demonstrated at the seminar by the leader of the research team.

2. He focused on critical points of the work requiring closer attention.

3. The researcher investigated the qualities of the material recently manufactured that could improve its strength.

4. Assistant scientists in industrial labs engaged in practical research show interest in immediate solutions to specific problems. Ph. D's in university departments doing fundamental research prefer abstract approaches.

5. The young researcher has papers and reports on his investigation recently published in periodicals.

6. The recent findings of the research group casting light on the earlier results are of particular interest.

7. We examined the style of the work that the young research director is engaged in.

8. The needs of a creative individual pushing him to work may not agree with the demands of the organisation that employs him.

**13. Виділіть підрядні речення. Відновіть пропущений сполучник та назвіть означуване слово.**

1. Here we listed several experiences a scientist might have at our organization.

2. Pay and status must agree with the achievements a worker demonstrates.

3. A layperson is not generally educated in the philosophy or methodology science is based on.

4. Beginning scientists an organisation employs must show their interest in its projects.

5. Desperate economic situation the government seems trying to improve results from the poor shape of the national industry.

6. Science is thought to be well organised when researchers have the possibility to tackle practical problems, i. e. the same laboratories are engaged in problems they set themselves and problems set them by the directors of industry.

7. The attempt Pasteur undertook to find out why certain crystals are lopsided resulted in the discovery of bacteria which cause diseases.

8. Drastic change in weather climatologists could not account for could have resulted from the greenhouse effect.

9. The new virus the physicians failed to identify has brought about an epidemic in the Middle East.

10. Many naive and ridiculous beliefs primitive men thought to be true (for instance that breathing and life were the same thing) are embodied in our language.

## **ON YOUR OWN**

### **What to Put on Students' Bookshelves?**

If chemistry, physics and biology are sciences let us teach them as sciences. Let us teach their concepts, their data, their experiments and their implication for science and society at large instead of simply presenting formulae and vocabulary to be memorised in incessant sequence while omitting the conceptual base of the discipline.

One of the things each of us as scientists should strive for is communicating the nature of the discipline. We have certainly done not very well when you look at the bookshelves in student bookstores and see the tremendous number of pseudo scientific paperbacks passed off as apparently valid science.

*Now try this:*

1. How does the author view the right way of science teaching?
2. What is the opposite way?
3. Why is the author dissatisfied with the literature students have?

## **Science Provides... Questions**

Today very much more can be said about history of life than was possible in Darwin's time. Generations of palaeontologists have explored most of the earth's crust and filled the museums with fossils. The data of palaeontology supporting the concept of evolution a century ago have now reached the state where all with an open mind regard them as complete proof. Nevertheless there is much more to be learned. As is true with all sciences, each discovery provides more questions than answers.

*Now try this:*

1. Find in the text the proof of the idea that "science is an ever-developing discipline".

## **A Risky Adventure**

Less than a decade ago there was a fierce debate involving scientists, political leaders, and the public about the risks of entering the new era, genetic engineering. Some of us were terrified by a possibility of a new devastating pathogen, the product of directed genetic recombination, escaping from the laboratory and causing an epidemic that the medical profession would be powerless to control. But it was also realised that this new technique, which could produce disaster, could also produce marvels — bacteria made to synthesise insulin and other human hormones, nitrogen-fixing genes to be introduced into plants. These possibilities for producing worthy results seemed endless.

*Now try this:*

1. What were the fears of scientists less than a decade ago?
2. What are the prospects the new area opens?
3. Does the new field, genetic engineering, concern only doctors?

## **Personal Qualities in Science**

There are four key qualities of a scientist as an individual. The first of these is competence, arising from the man's intellectual ability and from his training and experience. A second is self-confidence, which sometimes appears as dominance or even arrogance. A third characteristic is curiosity. This may appear in several forms, such as

zest for new experience, or enjoyment of puzzles. Involvement is the next one. This is the capacity to become absorbed in the problem-solving activity; the more effective scientists in all settings were deeply involved in their work. It depends partly on a personal capacity for enthusiasm, and partly on the nature of the work itself.

Each of these personal characteristics is essential to problem solving. The absence of anyone can block the effect of the others. The role of competence and curiosity is obvious; they are necessary, but by themselves not sufficient. Involvement serves to keep the mind absorbed and the energy flowing, for problem solving is tough work. The role of self-confidence is less appreciated than that of the other three qualities.

*Now try this:*

1. What is the source of competence?
2. Does self-confidence always demonstrate good sides of an individual?
3. What does involvement mean?
4. What stimulates involvement?
5. How could you grade the four characteristics according to their importance?

### **Safety Steps**

Some children and adults become infected with the AIDS virus through infected blood and certain blood products (used for transfusion and to treat diseases like haemophilia). The chance of becoming infected with the AIDS virus through transfusion in the United States is now extremely low. Donated blood and plasma have been tested for antibodies to the AIDS virus since spring 1985. In addition, those who want to give blood have been screened (not allowed to give blood) if they indicate that they are at risk of being infected with certain germs, including the AIDS virus.

If antibodies to the AIDS virus are found in donated blood, the blood is destroyed. However, the test cannot completely eliminate all infected blood. This is because it is possible for people to donate plasma or blood shortly after becoming infected unknowingly with the AIDS virus, or before their blood has produced antibodies that can be found by current blood tests. Although the current blood tests are very accurate, more specific and accurate tests are devel-

oped to make blood and plasma products even safer. Doctors sometimes suggest that people consider storing their own blood, in case they need a transfusion for scheduled surgery.

*Now try this:*

1. How do people become infected with the AIDS virus?
2. What source of the infection is practically excluded in the US? Why?
3. Are current blood and plasma tests one hundred percent safe?
4. What is being done to improve the tests safety?

### **Math and Earning Prospects**

Companies and academics should work together to convince schoolchildren and their parents of the solid earning prospects and real illumination associated with courses in mathematics and science. The country also badly needs a generation of senior managers, administrators and civil servants much of whose high-level general and management education has been grounded in mathematics and science.

The principles of mathematics, science and technology, properly understood and taught, which is not easy, must now be part of the foundation for an excellent education.

*Now Try This:*

1. What are the disciplines an excellent education is based on?
2. Why are we not yet successful in educating our young people in these disciplines?

### **ОБСТАВИНА**



**1. Виконайте завдання.**

- а) Виділіть зворот і поставте до нього питання.
- б) Виразіть обставину відповідним підрядним реченням. Перекладіть.



1. Seeing the mountains to be climbed man can work better.
2. Having done a good job the researcher got recognition and appreciation of his colleagues.
3. Having contact with a number of people in his area he was exposed to different viewpoints.
4. Providing good illustration of the procedures used in the labs the article is of interest to practitioners.
5. Given a chance to participate in the conference the young researcher prepared a good paper on his investigation.
6. Established on democratic principles the new lab is a stimulating environment.
7. (Being) measured by a variety of methods the parameters are supposed to be correct.
8. Having been explored and investigated by numerous expeditions the region is well known at present.
9. Taken into account beforehand the mistake did not cause any disagreement between the calculated and predicted data.
10. (Being) run in a traditional way the test did not show the expected accuracy.
11. Having been organised by experts the meeting was of great interest to all.

*в) Встановіть логіко-сміслові зв'язки між головним реченням та зворотом. Перекладіть.*

1. Scientists indicated their interest in the work expressing their desire to cooperate.
2. The Committee wished to identify the reasons of the failure, leaving the analysis of the progress to the sub-committee.
3. Ignorance and misunderstanding of the process are great, making the situation in the field dangerous.
4. Once understood the idea is not easily forgotten.
5. The prerogative of science is to cherish those hypotheses that can be verified, disregarding the rest as being useless.
6. The most difficult part of scientific procedure is to know what questions to ask, making the process of formulating useful hypotheses secondary.
7. Knowing underlying principles it is possible to show the ways in which these tendencies will proceed.

8. The conclusions from the tests are useful, helping to validate the hypothesis.

9. Giving students understanding as well as information the theory makes the question explicit.

10. Many use "theory" and "hypothesis" as synonyms, disregarding the fact that only in some time hypotheses may grow into theories.

11. The theory is fundamental, raising fundamental intellectual problems for many men.

г) Зверніть увагу на значення прийменників **in, on, by**. Де можливо, замініть зворот на підрядне речення. У яких реченнях **Ving** виражає дію, що передує у часі дії головної частини речення?

1. In competing in the international arena scientists and engineers promote strong and constructive partnership of science and technology.

2. On unleashing powers he cannot control, man starts appreciating evolutionists' efforts in biology.

3. By transmitting knowledge humanity enriches its cultural heritage.

4. On engaging themselves with higher education companies have already seen its value.

5. By understanding the validity of data derived through a scientific process students learn to seek scientific truth.

6. On accumulating more and more information we have changed our explanations of the natural world.

7. By testing animals' fossils employing X-ray technique scientists are able to know something about the time they lived in.

8. In interviewing students graduating higher schools managers try to find out the prospects that attract the young people most of all.

г) Замініть зворот підрядним реченням, звертаючи увагу на вибір граматичного часу для присудку цього речення. Перекладіть.

1. Once analysed the phenomenon is easy to predict.

2. When comparing the two hypotheses pay attention to the evidence recently found.

3. After having suggested the idea, the scientist began his hard work of validating the hypothesis.

4. When debating these questions scientists showed the benefits and the risks of entering the new area.
5. Once validated the hypothesis becomes a theory.
6. Until checked the data remained questionable.

## **2. Виконайте завдання.**

*а) Визначте суб'єкт дії, вираженої дієслівною формою. Перекладіть.*

1. Audiovisual resources being of importance and value for instruction, teachers widely use them in the classroom.
2. The conceptual framework of the work having been made, the researcher saw the lines of his investigation more distinctly.
3. Other topics having direct relevance to the subject-matter in question the discussion went on for several hours.
4. The hypothesis of evolution having been established as true, we have obtained new evidence on organisms that lived in the past.
5. The problem of food having been dealt with in a significant manner, the welfare of the country is now increasing.

*б) Визначте зв'язки між головним реченням та зворотом.*

1. Science is a human area, with people there trying to answer questions of human interest and importance.
2. Science bases its statements on data, intuition playing none the less important part.
3. The essays of the explorer made considerable impression on his contemporaries, the facts and conclusions presented there being of high scientific value.
4. Familiarity with living organisms increases, with questions about them arising in numbers.
5. The rocks of the earth's crust hold the secrets of many events of the past, evidence of past life being found in granites and lavas.
6. We can become somewhat bolder in formulating our deductions, the past being not closed to study.
7. The two scientists independently came to the same conclusion, the ways and methods chosen being quite different.
8. Classification is the most powerful method for packaging information, all the other techniques failing in some cases.
9. All gases and liquids are known to expand when heated, their density being at the same time reduced.

10. Measuring sometimes means comparing something with some standard, with scientists simplifying the procedure by using as few standards as possible.

11. The chance preservation of a fragment of the artist's personal diary and of several letters enables us to trace the period of writing accurately, without special equipment being used.

12. It is impossible to foresee whose contribution will be decisive and who will be the first to explore this field, with many brilliant brains participating.

13. Some cities seem to be a part of the historical past of the people, with citizens preserving many ancient monuments.

14. An effective method to familiarise learners with reading material is to teach previewing before actual reading, with teachers using new interesting materials.

15. Human energy output and needs are usually measured in calories, a calorie being the amount of heat which raises temperature of a kilogram of water by one degree Centigrade.

16. We know pretty well what a human being needs for health, with physicians basing our successful rationing system on this knowledge.

17. It was Clausius who in 1875 established the kinetic theory of matter according to which molecules are in constant motion, the motion itself being heat and their velocity being dependent on the temperature.

18. It is to be hoped these interesting experiments will imitate a series of similar investigations, which may offer a final solution to the most important problem of tumour-specific resistance, with many institutions collaborating.

### **3. Передайте інформацію підрядного або частини складносурядного речення *Ving/Ved<sub>3</sub>* -зворотами.**

1. We could solve many human health problems if we know the ways of controlling the disease organisms.

2. This new area (genetic engineering) could produce marvels and disaster and both are in the hands of man.

3. If we used an alternative approach we would come to similar conclusions.

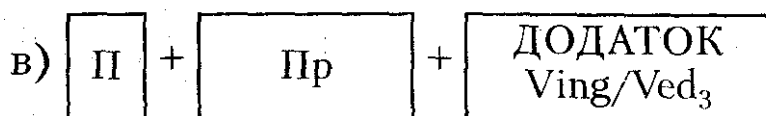
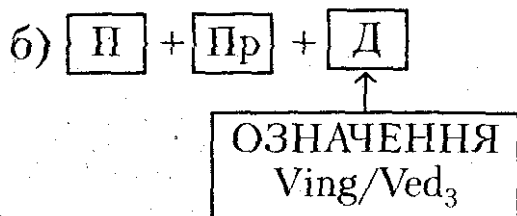
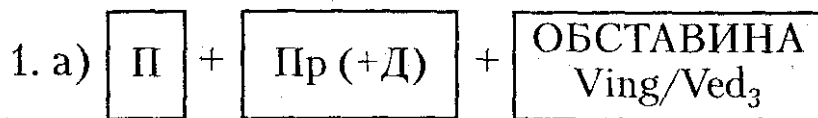
4. Evolution of many species was altered by man, which causes great changes in the environment.

5. The method is widely used because it is effective.
6. After the engineer had applied his new device he got accurate results.
7. Since the problem is global it involves other countries.
8. When the approach was tested in different conditions it was found satisfactory.

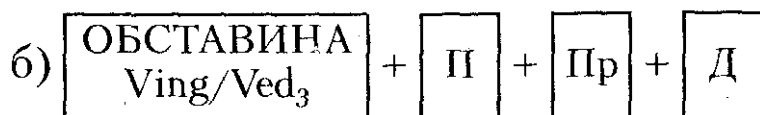
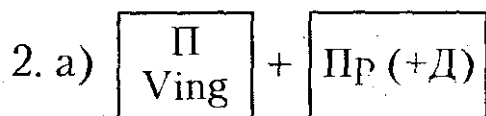
**4. З'єднайте обидві частини речення в одне, оформіть одну з них *Ving/Ved<sub>3</sub>* –зворотом. Зверніть увагу на підмет в обох частинах. Встановіть причинно-наслідковий зв'язок між обома частинами.**

- |  |   |
|--|---|
| 1. they asked him about his current research                       | — he answered openly and willingly                                |
| 2. the model is applied in various cases                           | — the model can be of some use                                    |
| 3. the nature of the phenomenon is discovered                      | — we could predict its development                                |
| 4. man accumulates more information                                | — his knowledge about the world changes                           |
| 5. the results are incorrect                                       | — it suggests that the method chosen is wrong                     |
| 6. students are exposed to big ideas                               | — students could find learning stimulating                        |
| 7. investigations provided useful data                             | — the researcher could prove his hypothesis                       |
| 8. the concept receives considerable attention                     | — the concept is a revolutionary step in the field                |
| 9. other kinds of studies are recently completed                   | — scientists can find explanations to various facts and phenomena |
| 10. the data were drawn from the application of diverse techniques | — the data made significant contribution to our knowledge         |
| 11. conceptual advances have been made                             | — new ideas have been developed                                   |
| 12. the problem received great attention                           | — the problem involves study of the natural history               |

5. Визначте, до якої з трьох схем належать подані речення. Визначте речення, до яких можуть підійти дві схеми. Вкажіть у реченні ті ознаки, на підставі яких ви вибираєте схему.



1. He considered hard cases raising a lot of problems to solve.
2. They chose simple cases, leaving hard problems unsolved.
3. We rely on the methods being tested in current experiments.
4. He objected to the new methods being applied without thorough tests.
5. He validated the hypothesis proving the existence of living organisms on the planet.
6. The lab suggested a new approach, making the calculations simpler.
7. The success depended on the researcher employing up-to-date equipment.
8. The mistake occurred because of the assistant being incompetent in handling the data obtained.
9. A lot of problems arise as a result of doctors ignoring the side-effects of the drug.
10. The performance of a scientist increases due to the lab chief giving him freedom in testing his ideas.





13. The problem involving science in any serious manner testifies to its being an important intellectual and social issue.

14. The issue having received a vigorous response by the scientific community we could consider it a major problem of the time.

15. Influenced by the work of this scientist is a research team of the Physics Department that pioneered in the area 30 years ago.

16. (Being) interested in the lab's good work the scientific director changed its organisational structure.

17. Continued direction of a chief might stunt initiative and independence of the researcher.

18. Continued along the new lines the research showed some progress.

19. Interesting young people in science will play a part in their future choice of the career.

20. Interesting findings were reported at the lab meeting.

21. Broadening the channels of scientific communication you can help to keep open the potential for growth.

22. Broadening areas of communication are a good sign for world science future development.

23. Intended as models for the analysis are the approaches suggested by a group of engineers engaged in research.

24. New and stimulating at that time were the ideas suggesting life on other planets.

**6. Закінчіть речення. Згадайте схеми попередньої вправи.**

1. Involving outside colleagues in discussions... (2 варіанти).

2. Using principles and techniques from neighbouring fields... (2 варіанти).

3. Understanding mechanisms and patterns of man's behaviour... (2 варіанти).

4. The research providing a number of testable hypotheses... (3 варіанти).

5. Current data drawn from application of diverse techniques... (2 варіанти).

6. Based on recent evidence... (2 варіанти).

7. Helpful in a limited number of tests... (2 варіанти).

8. The public being naive and ignorant about the limits and successes of science... (2 варіанти).



9. Science and technology making remarkable advances...  
(3 варіанти).

**7. Замініть інфінітивний зворот на підрядне речення.**

**а)**

1. To work efficiently in business one needs to know foreign languages.

2. To extend your horizons read abundantly in the chosen area.

3. To run a discussion speakers should get to know one another.

4. Climate watchers use satellites and little balloons to gather data that are valuable to students of climate change.

5. A committee was created to do research aimed at preventing pollution through education.

6. To be sure that there is no mistake the two research teams should come up with the same results.

7. New evidence is required to determine the authenticity of certain data.

**б)**

1. For career opportunities to be larger one should be broadly educated.

2. For a message to be understood its wording should be clear.

3. For little-known inventions to become famous we need instruments of communication.

4. For a natural disaster to cause less damage preventive measures are to be taken.

5. In order for us to accept the assumption the process should be observed repeatedly.

6. For auroras to exist the atmosphere must be present.

7. For a second language to be learned faster the students should study regularly.

8. For a panel discussion to be a success a good chairman, good speakers and a careful planning are a must.

**8. Згорніть підрядне речення в інфінітивний зворот.**

1. A problem is presented to listeners so that they can take part in working out various solutions.

2. A new technique was devised so as one could determine which of the assumptions is correct.

3. Many people read the methods section first so that they could see the author's contribution first.

4. The main results are summarised at the beginning of the discussion in order that the reader get a general picture.

5. In order that the results be presented clearly and orderly tables are given at the end of the survey.

6. The researcher needs to know the potential reader so that his ideas could be appreciated.

**9. Об'єднайте подані частини в одне складнопідрядне речення з підрядним мети.**

- |   |   |
|---|---|
| 1. a scientist works efficiently                    | — there should be enough contacts with his colleagues |
| 2. the direction of a chief should be limited       | — a subordinate grows in his skills                   |
| 3. a young scientist may develop several areas      | — he should be stimulated and encouraged              |
| 4. future directions of research are to be outlined | — a scientist may see better his place there          |
| 5. new data are to be collected                     | — the hypothesis may be proved                        |

**10. Дайте відповіді на запитання.**

1. The tactic is too artificial to be accepted by a creative worker.  
(Can the tactic be accepted?)

2. He is an expert in the area to overlook fresh ideas.  
(Does it happen that he overlooks them?)

3. The subject is stimulating enough to interest people in it.  
(Will people get interested in it?)

4. The work is too challenging for an inexperienced worker to do efficiently.  
(Will he do the work well?)

5. The data are large enough to be statistically significant.  
(Can one rely on the data?)

6. The effort was too little to be successful.  
(Was the effort fruitful?)

7. The ideas are too advanced for a student to see the point.  
(Can a student understand the subject well?)

8. The current events are sufficiently rapid to bring about dramatic changes in the near future.

(Will changes come soon?)

9. The examples are giving too much information for the audience to form basic understanding of the phenomenon.

(Does the audience fully grasp the lecturer's ideas?)

10. The presentation of the methods and techniques is full enough to give rise to the current research interest.

(Were researchers satisfied with the presentation?)

**11. Чи є ідентичними за змістом інфінітивні звороти у наступних реченнях?**

1. To sum up the discussion we are to consider all viewpoints expressed here.

2. To sum up, the discussion is fruitful since alternative approaches were considered.

3. To anticipate new advances in the area students should be exposed to broader concepts and more challenging ideas.

4. To anticipate, new advances in the area are to be expected only if students are exposed to more challenging ideas.

5. To be sure about the results of your teaching efforts bring to the next generation a true and modern view of the nature of things.

6. To be sure, the results of your teaching efforts will be great if you mean to tell the young the truth.

## **ON YOUR OWN**

### **Population Growth in China**

Since 1920, the population in China has doubled. With over one billion people today, China accounts for 23 percent of the world's population. This increase is the greatest problem in China's plans to modernise itself. In order to solve this population problem, China has begun a "one child" policy. This means that married couples have to limit their families to one child even if they would like to have more children.

This policy has been mostly effective in the big cities where residents live in crowded apartments. In the countryside, however, the farmers say they are hard pressed to limit their families to one child

since they need more children to help with the farm work. Factories and farms reward "one child" families with free medical care, better housing, extra vacations, and cash bonuses. If couples have more than one child, they lose their benefits, and their salaries may be cut by 10 percent or even more. This trend to "one child" families should slow down China's population growth to a rate of 1.3 percent per year.

*Now try this:*

1. Say if the first sentence is complex or simple.
2. What made China start a "one child" policy?
3. What are the meanings of the verb "have" in the sentence: "This means that the married couples..."?
4. Do farmers object to the policy? Why?
5. Find infinitives and identify their functions in the sentence: "In the countryside, however, the farmers..."?
6. Do you think the last question is a supposition of the author or his categoric conclusion? What helps you to decide?

### **Global Warning About Global Warming**

Discussing the rapidly growing concern about global warming, both scientists and popular media suggest two leading strategies for reducing CO<sub>2</sub> emissions from fossil-fuel combustion: revitalising nuclear power and improving energy productivity, with only one of these options yielding major and timely CO<sub>2</sub> reductions at reasonable cost.

The fact is that nuclear power can displace only fossil-generated electricity, which accounts for just one-third of fossil-fuel CO<sub>2</sub> emissions. In contrast, powerful end-use efficiency options are available for the entire range of fossil-fuel uses, including the two-thirds of uses (transport and heat) for which electricity is an uneconomical or impractical substitute.

Energy productivity improved, greenhouse warming can be ameliorated, acid rain and air pollution reduced, money saved. Another advantage of this strategy is that U. S. competitiveness can be greatly increased and the problems of power avoided.

Given the urgency of abating global warming, can we afford to invest in nuclear power when those same dollars, if put into efficien-

cy, would displace far more CO<sub>2</sub>? This comment is meant to stress the urgency of averting the greenhouse warming, a warming of even 1° C being too much to control climatic changes.

*Now try this:*

1. Are the strategies equally good without reservations?
2. What is the main condition for ameliorating greenhouse warming, reducing acid rain and air pollution, saving money?
3. What would be the answer to the author's question?

### **Beware of the Enemy**

If you think you are safe from AIDS because of who you are, you are wrong. For it does not matter where you live or who you spend your time with. It does not matter you are black, white, Hispanic, Asian, American Indian, or Alaska Native. It does not matter whether you are a construction worker, police officer, designer, politician, or athlete. People don't get AIDS because of who they are. Being an infectious disease, AIDS does not discriminate.

In many cities across the United States, AIDS is the leading killer of young men. When you know the facts you can protect yourself and the people you care about. By taking responsibility for yourself and your partner, you won't have to worry about getting AIDS or giving it to anyone else.

*Now try this:*

1. Why is AIDS a dangerous disease?
2. Is ethics involved in the anti-AIDS campaign?
3. Do you share the author's optimism expressed in the last sentence?

### **Science versus Humanities?**

Industry is by no means interested solely in the number of engineers and scientists. As members of the community we take pride in the vitality of national life derived from the values of the arts and humanities; as employers we note that many of our best and most creative recruits in many departments and at many levels have their educational backgrounds in the arts. Considering all this, higher education must maintain human values and be strong in all its disciplines, while ensuring that the language and perspectives of mathe-

matics, science and technology, essential for modern working life, are properly familiar to all those it educates.

*Now try this:*

1. Do people with educational backgrounds in the arts have better prospects for getting a job?
2. What are the tasks of HE today?

### **Voters Are for Science**

Scientists are normally regarded as detached and concerned with other than human issues. In treating science as an enterprise that exists for itself, we have failed to relate science to the human mainstream. For students, particularly, non-science students to be successful and useful as community members universities must acquaint them with societal applications of science and the fact that scientists are concerned with society and humanity as anyone.

Being non-scientists most voters demonstrate great misunderstanding of science. This is the situation that need be remedied. For decisions will be made, and made by scientifically educated people, they will be wise.

*Now try this:*

1. What mistake has been made in the attitude towards science in the society?
2. What should students be aware of in the university years?
3. What situation should be changed? Why?

### **Inspiring Science**

In a well-known essay, "Nothing in Biology Makes Sense Except in the Light of Evolution", Theodosius Dobzhansky summarised his position after surveying the major fields of the biological sciences: "Seen in the light of evolution, biology is, perhaps, intellectually the most satisfying and inspiring science. Without that light it becomes a pile of sundry facts, some of them being interesting or curious but making no meaningful picture as a whole".

*Now try this:*

1. What way of looking on biology does the author suggest?

## ФОКУСУВАННЯ УВАГИ ЧИТАЧА

**1. Виділіть підкреслені частини речень. Конструкції *it is ... that, it is not until (after) ... that* можуть виявитися корисними.**

1. Fredrickson enabled medicine to develop into a truly separate discipline.

2. The idea derived from the data is of particular importance.

3. Many researchers read the methods section first.

4. These facts give the scientist an idea as to the nature of the process.

5. A scientific experiment is performed to test the scientist's beliefs.

6. The question could be answered only after the introduction of the article is read (2 варіанти).

7. Only after a problem is presented to listeners they can take part in thinking of various solutions (2 варіанти).

8. Only quite recently the accepted hypothesis was attacked and questioned (2 варіанти).

9. You could encourage the young generation of scientists only when they realise the problems they are to tackle (2 варіанти).

**2. Визначте речення із рамковою підсилюючою конструкцією.**

1. It is important that a statistician should give adequate numerical data.

2. It is statistics that deals with numerical data.

3. It is helpful when the main results are summarised at the beginning of the discussion.

4. It is when the speaker makes his talk comprehensible to all that we call him a good speaker.

5. It is desirable that the researcher knows for whom he is writing an article.

6. It is a correct suggestion that comets are rich in organic matter.

7. It is the hypothesis suggested by new lab assistant that could interpret the evidence obtained.

8. It is a well-known hypothesis that dinosaurs were wiped out by a six-mile-wide asteroid.

*На що ви орієнтувалися, роблячи вибір?*

**3. Прочитайте. На якому факті, предметі тощо зосереджується ваша увага?**

1. It is not until the 1980s that technology began to catch up with the ideas.

2. It was not until 12,000 years ago that an ice-free corridor had allowed the people who wanted to reach Alaska to pass.

3. It was American Indians' ancestors who first found the New World.

4. It is urban pollution that is partly to blame for the increase in the number of asthma attacks.

5. It is Van Ceulen who devoted a good part of his life to calculating the value of pi.

6. If children are not interested in games we have designed, it is the games that we should try to change, not the children.

7. It is not until after the first physiological needs are satisfied that man feels a need to speculate about his self.

8. It is when one leaves school that the objectives in life become quite clear.

**4. Прочитайте. Виконайте завдання.**

*а) На якому члені речення фокусується ваша увага? За рахунок чого це відбувається? Трансформуйте ці емфатичні вислови у нейтральні. Який елемент речення при цьому зникає?*

1. A good navigator does change the course when he finds the map wrong.

2. The activity was a success because the participants did show their interest.

3. The approach did really help him to make progress in different disciplines.

4. Listening is certainly far from being a passive skill.

5. The scientist does in fact focus his attention on the ideas that seem impossible at first.

6. Philosophers make it clear that thought does not in fact transform into words automatically.



7. The situation does highlight the need for us to treat our planet with great care.

8. The analogy proposed does not really seem sound.

9. This attractive hypothesis does make us forget inconvenient facts.

10. The new pattern of education does in fact prepare our young people to do something in this world.

11. The book did really go far in its ideas and was a help to many.

12. Some students do feel traumatised when they are to produce rapid foreign-language responses, others do not experience any difficulty.

*б) Чи можна присудок у наведених реченнях виділити інакше? У яких реченнях і чому цього зробити не можна?*

1. Success with the new drug really gave hopes that the disease might be treatable.

2. This discovery will certainly make people stop with wonder at our planet.

3. No doubt, the technique requires several months to master.

4. The method used by Italian researchers really cuts costs and increases production.

5. The approach surely solved the energy problem for the area.

6. Undoubtedly, researchers will never rely on unchecked data.

7. His ideas definitely entered certain countries in the past.

8. It will certainly take more than a decade to rebuild the crippled data base.

9. There in fact remained two main obstacles to believing in the reality.

10. Experts realised that geological conditions there had in fact been unfavourable for man.

### **5. Визначте присудок у наступних висловлюваннях.**

1. Given at the end of the chapter is advice on the best way to acquire and record information.

2. Important for the new researcher are review papers that together with relevant monographs form the first source to be read to get basic information.

3. Presented here is some knowledge of the history of the original investigation.

4. Of great help to the engineer are contacts with experts that broaden his knowledge and give advice as to techniques and methods.

5. Suggested in the article are details concerning how long the investigation is likely to continue.

6. Included in the drug assessing team is a pharmaceutical expert who is to evaluate the side effects and effectiveness of the new drug.

7. Based on statistical analysis is the fundamental study that requires exact figures of evaluation.

8. Increasingly clear to all engaged in the investigation seems the idea that such animals could survive in these unlikely settings.

9. Generally accepted today is the existence of the dark matter the composition of which is yet unknown.

10. Interesting to the visitors of the museum is a plant that has been documented to catch mice, frogs and small birds.

11. Effective so far appears the system of updating materials that can keep students abreast of emerging knowledge.

**6. Який вигляд приймуть висловлювання за прямого порядку слів? Що зміниться при такій трансформації у змісті висловлювання?**

1. Little do we know yet about the tumour-forming processes.

2. Not only was the method less complicated than the traditional technique, it apparently worked better.

3. Seldom does history repeat itself, but sometimes it comes fairly close.

4. No longer do we consider the procedure effective for the analysis.

5. Hardly ever before did an epidemic of ecological neglect spread at such a fast rate.

6. Not only does the technique make it possible for man to acquire and use language, it also helps to perform various operations.

7. Nowhere in his earlier works has the author given the reader both a historical perspective and a panorama of the present science so vividly as here. Nor did he try to impress the reader with the recent discoveries.

8. Only when scientific work is done carefully will it benefit man.

**7. Трансформуйте підрядне речення у його неемоційну форму.**

1. Crude as they were, Holmberg's simulations revealed that passing galaxies can indeed slow each other down.

2. No matter how much memory the home computer may have, it can not handle such a stream of data.

3. The Chudnovsky's equation, monstrous though it is, doesn't involve rounding off fractions until the end of the calculation.

4. However satisfying learning might seem, the learners will not perform effectively unless they are adequately motivated.

5. Valuable as the work of this scholar may be, the method here advocated is relatively untried.

6. Illuminating though his remarks are, the author could not show the true cause of the situation.

7. General as such observations may seem to a layman, they do posses important points for further analysis.

8. No matter how large the defects of the present work are, its method is sound and useful.

9. However elementary the book may be, it does give the reader the idea of the discovery.

**8. Який логіко-смісловий зв'язок реалізує *Ving*-зворот? Яке запитання можна поставити до цієї частини висловлювання?**

1. These new methods are failures, ignoring as they do the knowledge of the science of language.

2. The approach cannot be a sound principle, overlooking as it does the recent developments in the field.

3. Academics and businessmen should be confributors to higher education, believing as they do in the future prosperity of the country.

4. Industry needs more than engineers and scientists, engaging as it does man with his human values.

5. Universities ensure progress, concentrating as they do on crucial ideas of science and technology.

6. The system is good enough, offering as it does a wide range of opportunities.

## **ON YOUR OWN**

### **Japan's Underground Frontier**

With population nearly half the size of the US's squeezed into an area no bigger than Montana, Japan has virtually no room left in its teeming cities. Developers assure that it is subterranean cities that could help ease the space problem.

Japanese companies say they have the technology to build extensive subterranean projects. Not only would temperature and humidity be controlled, say the planners, but real sunlight would be reflected in through vents from the surface.

But complicating the task was the psychological barrier to living away from the sun and the sky. Critics see the potential for mass claustrophobia. For that reason, planners foresee few underground housing projects, at least initially. The idea is to move offices and stores beneath the surface to free up the land above for the residential buildings. People would become vertical commuters, going down a huge elevator shaft to work.

The supporters of underground living believe it can be made comfortable. They are sure that creating an illusion is not so difficult as one might think.

*Now try this:*

1. What is the way out of the space problem in Japan, according to some Japanese companies?
2. What are the advantages of the project the planners offer?
3. What is the biggest obstacle to living underground?
4. What shows that planners realise the risk?
5. What idea is behind the developers' project?
6. What are the grounds for the supporters' optimism?

### **Science versus Reality**

Rarely has a medical theory gained such broad popular currency as the notion that hurried, aggressive and hostile people — the so-called Type A personalities — are at higher risk of heart attacks than their calmer, more easy going Type B friends.

Indeed, the theory seems logical: too much stress will get you in the end. In fact, the theory has been widely debated in the medical community for years, and as many studies dispute it as support it.

The latest evidence is perhaps the most definitive to date to undermine support for the Type A theory.

Researchers at the University of California studied, over a dozen years, 257 men who had heart attacks. The results really surprised the doctors: it was exactly the reverse of the prevailing theory. One possible explanation: Type A's changed their lifestyles more vigorously than Type B's to lower their risk of a second attack.

They also may have a more positive attitude toward recovery than Type B's. Some researchers, questioning as they do the reason, believe in the accuracy of the results. So, they make the conclusion that the theory might simply be wrong.

Others say it is too early to throw out the theory, even though the new study casts a long shadow on the idea that Type A behaviour leads to heart disease.

*Now try this:*

1. Is it often that people easily accept medical ideas, or, rather, they make their own theories, based on their own experience?
2. Do all the researchers agree with the interpretation of the results obtained in California?
3. How do you understand the title of the text?

### **Sleep Research Today**

Although sleep research has improved our understanding of sleep and insomnia, researchers still do not know just why sleep is necessary. Sleep does not seem essential for health since some people can get along with very little sleep. Nor does sleep merely give us back energy that was depleted during the day. Some of the more significant new studies link sleep to our "body clock", where certain patterns do occur in sequence.

Some researchers believe that during sleep the brain and nervous system carry out necessary activities. People with insomnia are often anxious or depressed. They can often cope with their troubled thoughts during the day, but as they try to fall asleep, their bodies relax. Then it becomes impossible to avoid these thoughts. And it is just this state that reinforces their insomnia. The chances are they will need medical help to cure their sleeplessness.

*Now try this:*

1. What health problems may well be solved without sleep?
2. When is a person most likely to suffer from his daily troubles? Why?
3. How is insomnia linked with body relaxation?
4. Find all instances of emphasis in the text?

### **Scientific Literacy**

It should not come as any shock that we are a scientifically illiterate society. Half of the population in America makes its acquaintance with science in the elementary and secondary schools and most of the other half receives a quick survey in an introductory college course. It is these courses on which we need to concentrate to do away with scientific ignorance of our population.

The arrogance of ignorance is everywhere present. Decisions are being made loudly and clearly on inadequate and inaccurate data. The proponents of certain theses seem almost proud of the fact that they are not influenced by the realities of the situation. When all around us we can see the necessity for scientific knowledge and for a comprehension of the relationship between science, society and technology, we must offer all we can to achieve this end.

*Now try this:*

1. How does the author describe the situation in the American society from the viewpoint of its literacy?
2. Where do people get their first notions in science?
3. Why are they not always adequate?
4. Which stage of education (school, college, university) is the most crucial in shaping people's scientific outlook?

### **Source of Genius**

There are many reasons for believing that perhaps more than anywhere else it is at the beginning of any investigation that the source of genius is to be found. For what characterises a genius like Galileo, Lavoisier or Einstein is the economy of thought and effort by means of which he achieves his results. Each one of these men did find the key factor in the situation and went directly to the heart of the problem that had been baffling to his predecessors. The methods that all the three used at later stages of their investigations are well

known. It was in finding the key difficulty and in knowing precisely at what point to direct the well-known methods that the genius demonstrates himself.

*Now try this:*

1. At what stage of investigation does genius reveal himself?  
How does the author illustrate his idea?
2. What, in the author's opinion, is a genius?

# **ТЕСТИ**

## **TEST 1**

### **Read the text**

Apart from explaining the existing data, the theory proved to be of great value in directing the course of research. That is to say, it appeared to be a reliable instrument to get additional information. Mention should be made of the fact that the theory allows predictions to be made and new hypotheses to be formulated. Applying the theory scientists would find new ways of increasing our understanding of major phenomena of nature.

### **I. Choose the appropriate Ukrainian equivalent:**

1. apart from explaining the existing data

а) на відміну від пояснень, отриманих на підставі існуючих даних

б) окрім того, що теорія пояснює існуючі данні

в) крім існування/наявності пояснення даних

2. the theory proved to be of great value

а) теорія довела велику цінність

б) теорія виявилася дуже корисною

в) теорія, яку було доведено, виявилася дуже корисною

3. in directing the course of research

а) у напрямку розвитку досліджень

б) у поступовому розвитку досліджень

в) у тому, що пропонує шляхи розвитку досліджень

4. that is to say

а) тобто

б) слід сказати

в) вона (теорія) говорить про те, що...



5. it appeared to be a reliable instrument

а) з'явився надійний інструмент

б) вона (теорія) виявилася надійним інструментом

в) вона (теорія) виникла як надійний інструмент

6. mention should be made of the fact

а) було зазначено

б) можна зазначити

в) слід сказати

7. allows predictions to be made and hypotheses to be formulated

а) дозволяє передбаченням формулювати нові гіпотези

б) дозволяє робити припущення та формулювати нові гіпотези

в) дозволяє на підставі нових гіпотез робити припущення

4. applying the theory scientists would find ways

а) теорія, що використовується, допоможе вченим знайти шляхи

б) застосовуючи теорію, вчені, безумовно, знайдуть шляхи

а) застосовуючи теорію, вчені, ймовірно, зможуть знайти шляхи

## **II. Choose the correct verb-form:**

1. The theory... the existing data (explain, explaining, has explained, is explained).

2. The theory is a reliable instrument in ... additional information (obtained, obtain, to obtain, having obtained, obtaining).

## **III. Identify the incorrect verb-form:**

1. The information to be using was obtained with high precision instruments.

2. The evidence of the phenomenon could have been found a century ago when it has first observed.

## TEST 2

### Read the text

Symposia are regarded as a useful means for scientists to exchange their views. The General Symposium to be held this year will involve speakers of the working groups, each offering personal suggestion for how the problems in question might be investigated. It is at the Special Symposium that aspects of current research will be identified to be included in the university course of study. It should be said that the dual approach of these two types of symposia is certain to help in training specialists in the field.

### I. Choose the appropriate Ukrainian equivalent:

1. Symposia are regarded as useful means
  - а) симпозиуми вважаються ефективним засобом для
  - б) обговорення на симпозиумах виявляються корисними
  - в) вважається, що симпозиуми є корисними при розгляді шляхів
2. means for scientists to express their views
  - а) означає для вчених, котрі висловлюють свої погляди
  - б) вчені мають на увазі висловлення особистих поглядів
  - в) засіб для висловлення вченими власних поглядів
3. symposium to be held this year
  - а) симпозиум, що відбудеться в цьому році
  - б) симпозиум, що відбувся в цьому році
  - в) симпозиум, що відбувається в цьому році
4. each offering personal suggestions
  - а) які пропонують власні думки
  - б) кожна з них пропонує особисті думки
  - в) думки запропоновано кожною з груп
5. for how the problems in question might be investigated
  - а) стосовно того, як можна вивчати проблеми, що розглядаються
  - б) для таких проблем, котрі ставлять питання про вивчення
  - в) для питання, котре досліджується у цих проблемах

6. it is at the Symposium that aspects ... will be identified

а) це симпозіум, що визначить аспекти

б) ці аспекти буде визначено на симпозіумі

в) саме на симпозіумі буде визначено аспекти

7. to be included in the university course of study

а) для включення їх до курсу університетської освіти

б) які було включено до університетського курсу навчання

в) щоб вони включали викладання в університеті

8. the dual approach of these two types of symposia is certain to help

а) двосторонній підхід цих двох симпозіумів, безперечно, допоможе

б) ці два типи симпозіумів нададуть певної допомоги

в) безперечна допомога від двостороннього підходу обох симпозіумів

## II. Choose the correct verb-form:

1. The conference ... last year outlines the main trends of the field development (holding, being held, to be held, holds, held, has held).

2. The speakers ... their views on the questions that interest the majority of those present (has expressed, will be expressed, expresses, have expressed, are expressed).

## III. Identify the incorrect verb-form:

1. Trained specialists is the process that takes years.

2. A University course of study should include disciplines that have been show their importance and value.

## TEST N 3

### Read the text

A survey made by 350 experts rates the standards of living of megacities in 45 countries. Based on numerous criteria three areas were regarded as top-ranking cities: Melbourne, Montreal and Seattle-Tacoma, Laos and Kinshasa being found at the bottom of the

list. It may be pointed out that Kiev, in spite of having been affected by the accident in Chernobyl, scored 76 points out of 100. The reason may be that environmental conditions were not considered in rating the areas.

**I. Choose the appropriate Ukrainian equivalent:**

1. a survey made by 350 experts rated the standards of living
  - a) рівень життя, який визначили 350 фахівців, подано в огляді
  - б) огляд, проведений 350 фахівцями, визначав рівень життя
  - в) в огляді, зробленому 350 фахівцями, оцінювався життєвий рівень
2. based on numerous criteria three areas
  - a) ці критерії базувалися на даних про багато районів
  - б) на основі численних критеріїв три райони
  - в) вибір трьох районів базувався на багатьох критеріях
3. three areas were regarded as top-ranking cities
  - a) було зроблено висновок, що до найблагополучніших міст відносяться наступні три
  - б) у першу чергу розглядалися міста з трьох районів
  - в) три міста посіли вищі позиції
4. it may be pointed out
  - a) можна відзначити
  - б) слід зазначити
  - в) це можна виділити
5. Kiev, in spite of having been affected by the accident
  - a) у Києві мала місце катастрофа, незважаючи на яку
  - б) Київ, незважаючи на те/попри те, що він постраждав від катастрофи
  - в) в силу того, що Київ постраждав від катастрофи
6. Laos and Kinshasa were being found at the bottom of the list
  - a) а останні міста посіли Лаос і Кіншаса
  - б) займаючи свої місця у кінці списку, Лаос і Кіншаса знаходились
  - в) у зв'язку з тим, що Лаос і Кіншаса посіли останні місця

7. the reason may be that

а) такою може бути причина

б) причина може полягати на тому, що

в) це може бути причиною того, що

8. environmental conditions were not considered in rating the areas

а) вважалося, що екологічні умови впливали на рейтинг районів

б) екологічні умови не враховувалися при рейтингу районів

в) не вважалося, що екологічні умови впливали на рейтинг районів

## **II. Choose the correct verb-form:**

1. The group of experts ... their survey on numerous criteria (having based, was based, based, basing).

2. The environmental conditions of the area ... as dangerous for man's life (have regarded, regarding, regarded, have been regarded, regard).

## **III. Identify the incorrect verb-form:**

1. It should mention that ecology and economy are interconnected today.

2. Used statistical data it is possible to prove that progress may lead to destruction.

## **TEST N 4**

### **Read the text**

A catalogue, index and appendix are regarded as scientists's working tools. For it is known that a good list of references is sure to make one's work easier and more fruitful. The index to the monograph in question being brief and inadequate for many purposes, the work done by a group of enthusiasts is highly valuable. So scientists consider the catalogues compiled by the group to be greatly expanding the index of the monograph, with references being made to modern authors and concepts.

## **I. Choose the appropriate Ukrainian equivalent:**

1. A catalogue, index and appendix are regarded as scientist's working tools

а) каталог, покажчик та додаток розглядаються вченими за допомогою

б) вчені використовують їх при розгляді

в) каталог, покажчик та додаток вважаються робочим інструментом вченого

2. for it is known that a good list of references

а) для того, щоб визначити чи гарний список літератури

б) оскільки відомо, що гарний список літератури

в) для гарного списку літератури, який відомо

3. A good list of references is sure to make one's work easier

а) гарний список літератури, безперечно, полегшує роботу

б) гарний список літератури робить роботу вченого більш обґрунтованою

в) маючи гарний список літератури, вчений відчуває впевненість

4. the index to the monograph in question being brief

а) покажчик до монографії викликає багато питань через його стислість

б) оскільки покажчик до цієї монографії стислий

в) оскільки питання, підняте у монографії, розглядається стисло

г) монографія стисло розглядає питання

5. the work done by the group

а) виконана групою робота

б) робота, що група має провести.

в) група провела певну роботу

6. scientists consider the catalogue compiled by the group to be greatly expanding

а) вчені вивчають каталог і значною мірою розширюють покажчик

б) вчені вважають, що каталог, складений групою, значно розширює показник

в) вчені, які вивчають каталог, вважають, що група розширила показник

7. with reference being made to modern authors and concepts

а) при цьому роблять посилання на сучасних авторів і їх концепції

б) автори посилаються на сучасні концепції

в) із посиланнями на висунуті сучасними авторами концепції

## II. Identify the incorrect verb-form:

1. The work of the group was appeared to be highly useful for the problem being investigated.

2. A good list of reference suggesting by the group made work easier.

## III. Choose the correct verb-form:

1. The group ... an expanded index (was suggested, suggesting, has suggested).

2. Reference ... to modern authors (made, being made, was made).

## TEST N 5

### Read the text

The hypothesis does not seem to be as true 30 years ago as it is now. Whether it is really so is the question to be answered by scientists. But for a scientist to do it without reliable data is not easy. Nor is it possible to establish the name of the author of the hypothesis suggested. Most of the reference literature on the subject seems to have been published. Nevertheless sufficient evidence was not provided.

### I. Choose the appropriate Ukrainian equivalent:

1. the hypothesis does not seem to be true 30 years ago as it is now

а) 30 років тому, так само, як і зараз, здавалося, що гіпотеза є вірною

- б) зараз, як і 30 років тому, здається, що гіпотеза не є вірною  
в) 30 років тому гіпотеза не здавалася настільки вірною, наскільки здається сьогодні

2. the question to be answered by scientists

- а) питання, на яке вчені повинні відповісти  
б) питання, на яке вчені шукають відповідь  
в) питання, на яке вчені дали відповідь

3. for a scientist to do it without reliable data is not easy

- а) для цього вчений повинен мати легкодоступну інформацію  
б) без достовірної інформації вченому нелегко це зробити  
в) щоб це зробити, вчений повинен мати достовірну інформацію

4. nor is it possible to establish the name

- а) немає можливості також встановити і ім'я  
б) але є можливість встановити ім'я  
в) неможливо встановити ім'я

5. hypothesis suggested

- а) пропонується гіпотеза  
б) запропонована гіпотеза  
в) гіпотеза пропонує

6. literature on the subject seems to have been published

- а) ймовірно, літературу з проблеми вже опубліковано  
б) літературу з проблеми треба опублікувати  
в) ймовірно, літературу з проблеми буде опубліковано

7. sufficient evidence was not provided

- а) не треба було забезпечувати достатньою інформацією  
б) було підтверджено, що інформації недостатньо  
в) не було достатньо доказів

## II. Identify the incorrect verb-form:

1. The question for scientists to have been answered is put forward by a group of engineers.



2. The name of the author was been established as soon as the new information was obtained.

### III. Choose the correct verb-form:

1. The reference literature on the subject ... after the new data are obtained (have been published, published, will publish, will be published).

2. ... with sufficient evidence scientists could answer hard questions (providing, to provide, having provided, having been provided, provided).

## TEST N 6

### Read the text

A computer is considered to be a great help in any field of man's activity today. It should be emphasised that computers can't do away with our environmental difficulties, but they are supposed to allow the forces causing them to be understood. Simulating ecological disasters, teaching city planning and math skills-these are only a few of computer's abilities to be mentioned here. It is through computer programmes that the relationships between natural phenomena and people would be better demonstrated and analysed.

### I. Choose the appropriate Ukrainian equivalent

1. a computer is considered to be a great help

- а) розглядається комп'ютер, котрий дуже корисний
- б) вважається, що комп'ютер дуже корисний
- в) комп'ютер розглядає велику допомогу

2. it should be emphasised that

- а) треба підкреслити
- б) можна підкреслити
- в) особливо слід підкреслити

3. they are supposed to allow the forces causing them to be understood

- а) передбачається дозволити силам зрозуміти

б) передбачається, що вони дозволять зрозуміти сили, що їх викликають

в) передбачається, що вони дозволяють викликати сили, що допомагають зрозуміти їх

4. simulating ... disasters, teaching ... planning

а) моделюючи катастрофи, навчаючи плануванню

б) моделювання катастроф, навчання планування

в) змодельовані катастрофи, обізнаність у плануванні

5. abilities to be mentioned here

а) можливості, які згадані тут

б) які слід згадати тут

в) які згадуються тут

6. it is through computer programmes that

а) ці ретельно складені комп'ютерні програми

б) саме за допомогою комп'ютерних програм

в) це через такі комп'ютерні програми

7. the relationships would be better demonstrated and analysed

а) по-видимому, отношения будут лучше представлены и проанализированы

б) отношения должны быть лучше представлены и проанализированы

в) отношения, вероятно, будут лучше и смогут быть представлены и проанализированы

а) напевно відносини будуть краще представлені та проаналізовані

б) відносини мають бути краще представлені та проаналізовані

в) відносини, напевно, будуть кращими та зможуть бути представленими та проаналізованими

## II. Identify the incorrect verb-form:

1. Used a computer you may build a successful career.

2. A home computer has considered to be a great help both in housework and in budget planning, doing things fast and expertly.

### III. Choose the correct verb-form:

1. ... original, working programmes you need four key computer languages (for to build, building, to be built, to build).

2. After you take lessons in computer fundamentals you ... an expert understanding of computer techniques (got, will be getting, will get, have got).

## TEST N 7

### Read the text

The aim of the group meeting held recently was to find ways of applying the newly acquired data to the problem concerned. It should be mentioned that the group included prominent biologists and physicists engaged in the research of the great problem of the time, that of energy production. The group members discussed how the newly obtained observations supported some hypotheses and refuted others. It reviewed all information and synthesised an explanation for the problem being investigated.

### I. Choose the appropriate Ukrainian equivalent:

1. the aim is to find ways

- а) група складається
- б) мета полягає в тому, щоб знайти
- в) група повинна знайти

2. meeting held recently

- а) зустріч, яка скоро відбудеться
- б) зустріч, що недавно відбулася
- в) зустріч, яка зараз відбувається

3. ways of applying the data

- а) шляхи, які полегшать застосування даних
- б) спосіб, за яким дані застосовуються
- в) можливості використання даних

4. newly acquired data

- а) нещодавно отримані дані

б) дані, які знову будуть отримані

в) дані, які треба отримати

5. problem concerned

а) проблема стосувалася

б) проблема викликала занепокоєність

в) ця проблема

6. it should be mentioned that

а) це треба зазначити

б) це можна зазначити

в) треба зазначити

г) можна зазначити

7. group included

а) група, що приєдналася до

б) введена група

в) група включала

8. biologists and physicists engaged in the research

а) біологи та фізики, які займалися дослідженнями

б) біологи та фізики, які будуть проводити/провадитимуть дослідження

в) біологи та фізики займалися дослідженням

9. group members discussed

а) що, обговорюються групою

б) члени групи обговорили

в) члени групи, котрі обговорювали

10. newly obtained observations supported some hypotheses and refuted others

а) було отримано нові дані, які підтверджували одні гіпотези та спростовували інші

б) отримані дані було підтверджено одними гіпотезами та спростовано іншими

в) нещодавно отримані дані підтверджують деякі гіпотези та спростовують інші

11. it reviewed all information and synthesized an explanation

а) вони зробили огляд та підготували пояснення

б) це розглядає всю інформацію та отримане пояснення

в) це огляд всієї інформації та даного пояснення

12. for the problem being investigated

а) для вирішення проблеми

б) для вирішеної проблеми

в) з проблеми, що досліджується

## **II. Choose the correct verb-form:**

1. The participants of the discussion ... some hypotheses (supporting, supports, supported).

2. That was a meeting of experts concerned about ... new data (having obtained, obtained, obtain, obtaining, to obtain).

3. The group members ... to explain the problem concerned (will, is, are, was).

## **III. Find the wrong verb-forms:**

1. The meeting reviewed all information and synthesised an explanation for the problem being investigating.

2. The aim of the group meeting hold recently are to find ways of applied the newly acquiring data to the problem concerned.

people for whom work and pleasure are one. **The former** are the

majority.

Political authority and education are common sources of social

status. **The latter**, however, is usually easier to achieve.

7. *There, then*

He had his practice at Bell's Laboratory. The experience he got

**there** served him all his life.

The first civilised human communities were agricultural villages

about 10,000 years ago. Since **then** human civilisation has experi-

enced many ups and downs.

8. *Which*

If the economy of the country is to grow, the new government

needs to do much more to ensure that women can combine the

worlds of family and work, **which** is not that easy today.

## ACTIVITY 1

Read the short passages below and answer the questions.

Note that the correct answer depends on your understanding of

the reference.

1. At an early age, it is easy for a child to forget his or her lan-

guage completely and acquire another. This was demonstrated in the

experiment with a 6-year-old Spanish girl. When she was trans-

ferred to a French environment, she ceased to use Spanish after 93

days. In less than a year, she had a knowledge of French equal to that

of the neighbouring children.

1. What did the experiment with the girl demonstrate?

2. Who was transferred to a French environment?

3. What did the Spanish girl and neighbouring children have in

common?

2. Research into the physiology of the human brain showed a num-

ber of interesting facts. Before the age of nine, the child's brain seems

well suited for language learning. But this capacity decreases with

years. As proof of this theory, physiologists point to the difference

between adults and children. When the speech centre of the brain is

injured, the child's brain adapts itself. The child learns to speak again.

When this happens to an adult, he or she never learns to speak again.

# ТЕКСТ ЯК НОСІЙ ІНФОРМАЦІЇ ЛОГІКО-СМІСЛОВИЙ АСПЕКТ

## § 1. IDENTIFYING POINTS OF REFERENCE

The following is a list of the most widely used references and substitute word. Identify the references of the substitute words.

### 1. Third-person pronoun (it, they, he, she)

It is argued that taking notes of a lecture is an effective tool for a student to recall the argument. So most students adopt it, attempting to make an abstract of the argument while it is in progress. It is obviously a difficult task.

### 2. This/these, that (of)/those (of)

The year 2005 was marked by unusual human tragedies and natural disasters, giving, however, brilliant examples of courage, generosity and empathy. **This** brings hope: if we band together, it is really possible to change the world for the better.

Pressing social issues of poverty and inequality, as well as **those** of religious intolerance and political instability were in the focus of attention at the forum.

### 3. One

At present **one** can witness the collapse of the true sporting system, which is a result of many factors. The most obvious **one** is the connection between sport and business.

### 4. Such (+ noun)

Children's language may vary in complexity and size of vocabulary. **Such** variations, however, are of minor importance.

### 5. So

The politician is worried about the present economic situation. He thinks the rate of inflation will rise. I think **so**, too.

### 6. The former, the latter

Industrious, useful human beings may be divided into two classes: people for whom work is work and pleasure is pleasure and

1. Which capacity decreases with years?
2. Under what conditions would an adult never learn to speak again?

3. It is one of the features we take more or less for granted about our world that each nation has a language of its own. In France people speak and write French; in Italy, Italian; in Germany, German; in Russia, Russian; in England, English. Yet it takes only a moment's reflection to realise that there are many nations of which this is not true.

1. What is not true of many nations?

4. Technical language uses many conventional constructions, and the question of translating scientific work by machine was raised shortly after the development of the first computer. Since then the necessary procedures for machine translation have been developed and thoroughly studied.

1. Since when have the necessary procedures for machine translation been studied?

5. According to one of the traditional assumption about learning and buying, if people who have money expect prices to go up, they will hasten to buy. If they expect prices to go down, they will postpone buying. But research surveys have shown that this is not always true.

1. Which traditional attitude is not supported by research data?

## § 2. RELATIONSHIPS OF COMPARISON AND CONTRAST

MARKERS of COMPARISON:	MARKERS OF CONTRAST:
as...as, just as...so, like, similarly, in the same way, likewise, both...and, neither...nor, correspondingly	while, whereas, but, in contrast to, instead of, rather than, contrary to, conversely, on the other hand, although, in spite of, despite, however, yet, still, nevertheless, notwithstanding



## ACTIVITY 1

**Read the sentences and carry out the instructions.**

1. Just as many parents are apathetic to reforms in the school systems because they feel they are powerless to change things, so many citizens are apathetic to important foreign policy issues for the same reason.

*Fill in the blanks:*

The writer compares \_\_\_\_\_ with \_\_\_\_\_ from the point of view of their \_\_\_\_\_. Both groups of people are \_\_\_\_\_ because they \_\_\_\_\_.

2. Violence has become as inseparable from sport in the television age as sport has become from lavish sponsorship by governments, corporations, and spectators.

*Fill in the blanks:*

The combination of \_\_\_\_\_ and \_\_\_\_\_ is compared with the combination of \_\_\_\_\_ and \_\_\_\_\_.

3. Wealth may give status in some areas of society, but it will not give status in a professional organisation. Likewise with family or origin, which may be important in some spheres but less important in others.

1. According to the information given in the sentence, in which way is wealth similar to family or origin?

4. To make men critical is not as widely held to be a good thing as to make them love knowledge.

1. What is generally believed to be a good thing?

## ACTIVITY 2

**Read the sentences and answer the questions.**

1. Research in chemistry can only be conducted in the laboratory, whereas sociological research can only be conducted in the field.

1. Which two methods of research are contrasted?

2. In many novels of the nineteenth century, the poor are depicted as being evil, dirty and criminal. Conversely, the rich are depicted as being kind, generous and virtuous.

1. Which two depictions are different?

3. The scientist had proved his hypothesis, yet the people refused to accept this theory.

1. Was the scientist as successful among the people as he was in his work?

4. While most primitive societies mark the transition from childhood to adulthood, in our society the end of formal education is usually the first occasion for celebration.

1. How do we differ from primitive societies?

### ACTIVITY 3

**See if there is always a description of all the items that are being compared. If so, find it, if it is missing or incomplete, restore it from the context.**

1. When the planet Venus started out life some 4.6 billion years ago, it had essentially the same size and composition as the infant Earth. And yet it evolved into something totally different: a bone-dry rock shrouded in clouds of sulphuric acid, with the surface hot enough to melt lead.

2. Like energetic children racing about a schoolyard at recess, atoms bouncing around in the gas are hard to get a good, close look at. Both the children and the atoms move quickly, randomly, and with constant changes of direction. With children, however, one needs only ring the recess bell and march them back to their classroom seats to get them to slow down, if not stop moving completely. With atoms, it is a bit more complicated. Atoms in a gas move around almost randomly, changing directions after bouncing off other atoms or the walls of a container, and this motion causes various problems for scientists studying the properties of atoms. To combat these problems, researchers try to slow down atoms as much as possible and to hold them in one place long enough to get a good look at them. The average speed of the atoms in a gas is measured by the temperature of the gas, so the lower the temperature, the easier it is to study various properties of the atoms.

3. The French philosopher Descartes, three centuries ago, was the first to say that men were machines, guided by souls. It is obviously a useful idea, because we can ask the same sort of questions about the parts of our body as we do about the parts of a machine. What is the heart for, and how does it work? Its function is to pump blood round, as oil pump pumps oil round in many motors. And it has valves and other parts like those of pumps. In the same way we can compare the eye with a photographic camera, the nerves with telegraph wires, the fat under the skin with the insulating material round the boiler, and so on.

The description of man as machine is much more useful to-day than it was in Descartes' time, because in his day self-moving machines were worked by springs, like that of a clock, whereas now the best-known ones are worked by the burning of coal or petrol. The comparison between a man and an engine driven by coal or petrol is very close indeed, if we merely consider intake and output, and do not go into the details. Each requires combustible food or fuel and a large supply of air. In each case most of the food or fuel is combined with oxygen from the air and converted into carbon dioxide and water vapour.

#### ACTIVITY 4

**Show which items are being contrasted.**

1. Whereas student rebellions 200 years ago may have been motivated by social or economic troubles, the recent student discontent stems from the dissatisfaction of the young with their dependent status.

2. The average citizen of Ruritania knows little about the foreign policy involvement of his country. If asked about the latest football game, on the other hand, he will probably be able to supply full details.

3. In contrast to their parents who strive for conformity in dress and manner, the young people of the 1980s stress individuality and flout conventions.

#### ACTIVITY 5

**Complete the sentences by choosing one of the alternatives.**

1. Although the trade unions movements are intended to serve the interests of the workers,

- they often do much to improve working conditions;
- they often are influenced by political considerations.

2. A total of 23,000,000 private cars were owned by Americans in 1929, yet,

- the same number were bought the next year;
- this number dropped dramatically after economic troubles of that year.

3. Even though the scientist had asked for conditions of secrecy the container holding radioactive material

- was driven through the town in the middle of the day;
- was brought in through a side road in the middle of the night.

4. In spite of the fact that thousands of American prisoners were subjected to brainwashing attempts in Korea,

- only a handful chose to stay in North Korea after the war;
- many of them stayed in North Korea after the war.

5. Public figures in America live under a constant threat of assassination, nevertheless,

- they are prepared to make speeches in crowded public places;
- they travel everywhere with an entire crew of secret service agents.

## ACTIVITY 6

**Read the passages and answer the questions below.**

1. Lasers can cut, burn, destroy. They cut metal in factories; they burn off cataracts in eye surgery; they have even been nominated to destroy intercontinental ballistic missiles as part of a space defence system.

But there is a gentler side to lasers. Like a tiny, delicate pair of tweezers, a laser can be used to grasp and manipulate objects too small to be seen with the naked eye. For years, scientists have used lasers to trap microscopic particles, molecules, and even single atoms so that they could be studied in detail. Now researchers are using laser traps to study living microorganisms. With the development of lasers that are delicate enough to hold single-cell organisms without harm and even grab onto interior parts of these creatures and move them around, scientists have a new tool for the study of tiny living organisms.

1. What are the two large areas lasers are being used in?

2. Over the past decade the Japanese technological position has shown a remarkable growth. The share of the U. S. patents issued to Japanese inventors has been rising at 1% per year. These patents are the most frequently cited patents in the U. S. system. By 1984 Japanese inventors obtained more U. S. patents than inventors in the United Kingdom, France and West Germany combined, and the gap has been widening ever since. As measured by publications, the Japanese scientific position is more modest, with a 0.5% rise per year in papers and with barely average citation performance. These indicators characterise Japan as a technological powerhouse, with highly innovative technology, and an expanding but far less powerful scientific position.

1. In which two areas are the activities of Japan analysed?
2. In which of them is Japan taking the lead?
3. What are the grounds the author makes his judgement on?

3. Many substances used in daily life, such as coffee, alcohol, and pharmaceutical treatment for hypertension, have been accused of "menace" in causing cancer or other major diseases. Although some of the accusations have subsequently been refuted or withdrawn, they have usually been based on statistical association in epidemiological studies that could not be done with the customary experimental methods of science.

With these epidemiological methods, however, the fundamental scientific standards used to specify hypotheses and groups, get high-quality data, and analyse attributable actions. Despite peer-review approval, the current methods need substantial improvement to produce trustworthy scientific evidence.

1. Is there enough scientific evidence to consider these substances dangerous?
2. Is this opinion shared by all scientists? (Find the markers for both answers)

4. When this reviewer began high school seemingly a short while ago, lunar craters were a result of volcanic processes, dinosaurs had died of natural causes, and large holes in the ground were of only casual interest to planetary scientists. Now we view impact crater-

ing as one of the predominant geological processes in the solar system. Impact craters ranging in diameter from a few meters to thousands of kilometres are observed to dominate the surface of the moon and the other bodies of the solar system. The moon itself may have formed from material squirted off Earth during the impact of a Mars-sized body, and many think that dinosaurs were zonked in the aftermath of an extraterrestrial object's hitting Earth. The finite probability of such a collision involving Earth during one's lifetime is a sobering thought.

1. How has the recognition of the importance of impact processes in planetary history evolved since the reviewer's school years?
2. What hypothesis about the moon formation was suggested?
3. How do you know it is just a hypothesis and not a fact?
4. Look for the information in the text to answer the same questions about dinosaurs.

## ACTIVITY 7

**Read the following short passage. Tell which items or ideas are being compared.**

In a well-known essay, Huxley tells us that the method of scientific investigation is similar to the way in which the human mind works. According to the writer, there is no more difference between the mental operations of a man of science and those of an ordinary person as there is between the methods of a butcher weighing out his goods in common scales and the operations of a chemist in performing a difficult and complex analysis by means of balance and finely graduated weights.

Huxley goes on to tell us that we should be happy to know that we have been thinking scientifically all our lives just as the hero of Moliere's was delighted to discover that he had been speaking prose all his life.

## ACTIVITY 8

**Read the paragraph and summarise the views of McCann and Briggs.**

The failure of the educational system in America has been analysed differently by two educators. While both agree that learning does not take place in school and that pupils are forced to adapt to rigid demands, they differ as to the basic cause of the failure in education. McCann maintains that children have been programmed to give the right answer to the teacher's question. They spend their time devising strategies of getting the right answer rather than learning because the former will result in good grades. Briggs, on the other hand, emphasises the irrelevance of what is taught at school. The material has no relation to experience. In both cases, the child is not motivated to learn and ends up playing the game or dropping out. Both McCann and Briggs accuse the schools of lowering spontaneity and I. Q. While Briggs actually believes this "reactive stupidity" to be real, McCann views it as a further tactic in the pupil's arsenal against the teacher. By playing stupid, the child gets the teacher to help him with the correct answer. Both educators demand change.

## ACTIVITY 9

**Read the paragraph. Give two examples of opposed evaluations of the poor as they appear in literature and as they appear in social science publications.**

In recent years there has been an increase in publications in social science on the subject of poverty and on state-aided antipoverty projects. The new writings advance the same two opposed evaluations of the poor that are to be found in literature, in proverbs, and in popular sayings throughout recorded history. Just as the poor have been described as blessed, virtuous, upright, calm, independent, honest, kind and happy, so contemporary students stress their great and neglected capacity for self-help, leadership and community organisation. Conversely, as the poor have been characterised as shiftless, mean, violent, dirty, evil and criminal, so other students point to the irreversibly destructive effects of poverty on individual character and emphasise the need to keep guidance and control of poverty projects in the hands of the authorities.

## § 3. CAUSE-EFFECT RELATIONSHIPS

MARKERS of COMPARISON:	MARKERS OF CONTRAST:
as, because, for, since, due to (the fact that), owing to, for fear that, inasmuch as, as a consequence of, on the grounds that, as a result of.	therefore, so, thus, hence, so...that, consequently, resulting in, as a result

**NB!** *Cause and result relationships may also be signalled by such verbs as: to lead (to), to cause, to result (in), to necessitate, to influence, to stem (from), bring (about)*

### ACTIVITY 1

**Read the sentences. Name the cause and the result. Note which comes first — the cause or the result.**

1. Because factories burn waste materials, the level of air pollution is increasing.

2. Factories burn waste materials, therefore the level of air pollution is increasing.

3. There are many accidents since people drive dangerously.

4. Since inflationary tendencies continued, the government decided to change its policy.

5. The working conditions of the miners were very bad. As a result they were dissatisfied.

6. Management and workers rarely share common interests. Hence, it is usual to find that management tends to put in position of responsibility those workers who share its views.

7. The mistakes made by good readers are so clearly patterned that they provide interesting material for the researcher.

8. The high infant mortality rate in many African countries stem from unsanitary conditions and ignorance of personal hygiene.

9. In the nineteenth century, many conservatories dismissed the workers' complaints about living conditions on the grounds that the worker of the time had a longer life expectancy than an English lord did 200 years before.



10. As a consequence of demonstrations by citizens and repeated articles in the press, new measures have been introduced to deal with the growing number of crimes against children.

11. The decrees against the local population and a succession of attacks by ambitious political leaders led to mass immigration.

## ACTIVITY 2

**Name the cause and the result.**

1. Many stutters have no difficulty in singing. It makes sense therefore, to apply the techniques of voice development to control some of the physical elements of speech.

2. Inasmuch as formal education is a traditional aspect of our society, it is unlikely that a school system will be replaced by a more natural, undirected kind of learning.

3. There are numerous ways in which stimuli from without and from within may cause an infant's distress. Birth is believed to be a painful experience for the baby. Babies are often fed on schedule and little attention is paid to their cries of hunger at other times. They are bathed and dressed at stated times, whether they like it or not. Add to these discomforts the fact that some infants are handled rather roughly by their parents.

## ACTIVITY 3

**Read the sentences and answer the questions that follow the passages.**

1. Involving both hemispheres of the brain in human activity leads it to taking in more information, and in an easier way, too.

1. What makes brain perform better?

2. The devaluation of the Indian rupee necessitated by the high cost of exports causes much hardship among certain sectors of the population.

1. From what did the devaluation of the Indian rupee stem?

2. What was the result of the devaluation?

3. There is no context in which the idea of elites is invoked more often at the present time than in discussions of the problems of “underdeveloped countries”.

This should cause no surprise, for there is a profound association between changes in social structure and the rise and fall of elites. Economic and political changes always bring about modifications in the prestige and power in different social groups. In the present developing countries, therefore, we have an excellent opportunity to examine the social forces that are creating the new elites.

1. Why should we expect the idea of elites raised in discussions on the “underdeveloped countries”?
2. What is the effect of economic and political changes on different social groups?
3. What is the reason for the assertion that the present developing countries provide an excellent opportunity for examining the social forces that are creating the new elites?

#### ACTIVITY 4

**Read the following paragraphs and trace the chain of causes and results.**

1. The nineteenth century experienced a sudden growth of cities, with populations ranging from 100,000 to 8 million. An important reason for this development lies with the Industrial Revolution and the Agricultural Revolution.

Due to the introduction of steam power, the number of factories increased rapidly. Since the use of steam power required large amounts of coal and iron, there was a great need for a labour force. Consequently, more and more workers came both to the factories and to the coal fields. Hence, towns and cities developed around the new industries. The introduction of complex machinery, improvements in plant and animal breeding, and the development of fertilisers resulted in higher productivity; fewer farmers could produce more food. More and more farmers left their farms for fear of not being able to make a living. They looked to the developing cities for a new start.

## ACTIVITY 5

While reading the paragraphs note which comes first — the cause or the result.

Answer the questions that follow each paragraph.

1. Most electricity in Ohio Valley is generated by coal-fired power stations linked in a regional network. Emissions from these stations are widely implicated as major contributors to the acid rain and ozone that are straining relations between the United States and Canada and are believed to be damaging forests in the north-eastern United States and crops in the Ohio Valley.

1. Does the regional network cause troubles only abroad?

2. "Our results are honest and true; the only problem is that they are unexplainable. If challenging results are condemned by means of specially designed laws, this constitutes a death penalty to science".

1. What strategy in assessing scientific data is unacceptable, according to the author?

3. The large changes in the earth's climate during the last 18,000 years have altered the vegetation, ice volume, and sea-surface conditions over most of the globe. Ice sheets and some desert lakes disappeared, vegetation was drastically altered, many types of large mammals became extinct, and agriculture was developed, which changed the course of human history.

1. Follow the changes that led to a different turn in human history.

4. "Although specialists will find it an excellent overview of the field, the book is intended for advanced students. A successful book for such an audience must strike a fine balance between facts and principles and between old data and new: too many data and the reader is overwhelmed, too much theoretical or general material and the reader becomes detached, too eclectic a selection of examples and the reader is misled.

1. How to write a successful book for this particular audience?

5. Most people learn about science by studying the experimental methods of physics, chemistry, botany, or biology; but experiments are seldom possible in epidemiological research. Because of barriers in ethics or feasibility, the investigators cannot do experiments in which healthy people are randomly assigned to receive or not to receive long-term exposure to potentially noxious substances.

1. How would epidemiologists stage their experiments if they were allowed?

## ACTIVITY 6

**Read the text. Is the opening sentence is the cause or the result? Find more examples of both in the text.**

Perhaps Los Angeles will give up their patio torches, stop driving solo on the freeway, quit buying underarm sprays that use petrochemicals, build no more drive-through banks or restaurants, renounce charcoal lighter fluid, even surrender the backyard charcoal grill. Perhaps Los Angeles has the nation's dirtiest air. But it is not the only one. Most big cities cannot meet the federal limit on ozone, the key ingredient in smog. The air in Los Angeles is so bad — ozone here sometimes hits triple the federal limit — that a cleanup should begin immediately. There are plans to adopt a new attack on ozone, a highly reactive form of oxygen.

Paints, glues and pesticides would be reformulated to reduce volatile hydrocarbons. Buses and cars would be electrified, new transit systems would be built. Major new controls would be imposed on all kinds of public and private activities.

The Los Angeles approach has been hailed as a guide to the rest of the nation. But there are some tough questions about its feasibility, about the commitment of local governments to carry it out, and about its cost.

## § 4. GENERAL STATEMENT AND ILLUSTRATIVE SUPPORT

MARKERS of SPECIFIC EXAMPLES AND SUPPORTING STATEMENTS:

for example, e. g., for instance, that is, i. e., namely, particularly, specifically, in fact, a case in point, indeed, thus, as a matter of fact, to put the same thing in another way, in other words, to exemplify this.

**NB!** *The punctuation marks may also serve as clues (or markers) that help us to identify illustrative support. A colon (:) or a dash (—) tells us to expect an example or an explanation. Supporting statements may also appear in parentheses (...)*

### ACTIVITY 1

**Read the paragraphs. Find the marker, the general statement and illustrative support (explanation).**

1. What to produce as well as how and for whom would not be problems if resources were unlimited. If human wants were fully satisfied, it would not then matter if labour and materials were combined unwisely. There would then be no economic goods, i. e., goods that are relatively scarce.

2. Education, the mass media, the family, the religion, and government operate within a society to control and influence the lives of human beings. When agents of social control, such as those listed, lose their power, the behaviour of the society becomes unstable and unpredictable. In other words, there occurs what social scientists call social disorganisation.

### ACTIVITY 2

**Find the main idea and its illustrative support in the paragraphs below.**

1. The volume of modern literature makes it ever more difficult to keep up in one's own speciality, but the impact of one discipline on another is also increasing. Scientists, therefore, will need to know what is happening in other fields. DNA sequencing is no longer of interest just to molecular biologists; it expands into forensic medicine, evolu-

tion and disease diagnosis. Tunnelling microscopes are not just interesting to physicists, but to chemists, students of ceramics and solid-state surfaces, and biologists as well. No scientist can be an island.

2. We receive many more manuscripts than we can possibly publish. But we wish to improve the fare for our readers and help the advancing frontiers of all science. Winston Churchill said: "Remember the turtle, he only makes progress when his neck is out". There is credit for being a lonely pioneer as well as for being a participant in the gold rush.

3. Scientific journals try to serve the scientific community by hastening the recognition of areas that have not yet gained a great deal of exposure. For example, ecology played a very distinguished role in biology for a period of time, then seemed to diminish in interest, because many of the studies were repetitive or inconclusive. But now, grave threats to the environment make that science ever more important. Low-energy physics, in the limelight because of superconductivity, continues to make advances which have practical application, not only commercially, but also to other scientists. These are only a few of the many areas that need attention.

4. The US market is the largest and most sophisticated market in the world. Any company that wants to earn a substantial return from its technology will patent it in the U. S. Consequently, technology patented in the United States reflects the world's most significant technology. Any technology patented in the U. S. system is, by definition, original, since patents are only issued for products and processes that are novel and unobvious. Therefore, discussing a technology patented in the U. S., one is looking at original work.

### ACTIVITY 3

**Pay attention to how ideas, terms, titles, names, etc. are being explained in the short paragraphs that follow.**

1. Through much of the 19th century, "biology" meant "natural history", the observation and analysis of flora and fauna in the wild. For professional scientists; natural history supplied, of course, the fundamental data of evolutionary debate.

2. Some of the nation's powerful lobbies will be battling it out this summer, as Congress takes on the Herculean task of rewriting

the Clean Air Act, the basic law that sets the ground rules for combating air pollution. Billions of dollars will rest on how lawmakers deal with issues on which scientists, economists, industrialists, and environmentalists give conflicting advice.

3. Environmental activists, a physician, and a housing expert will share this year's awards from the Right Livelihood Awards Foundation. They will be presented in Stockholm, the day before the Nobel Prize ceremonies.

The Right Livelihood Awards were founded in 1980 by Jakob von Uexkull, member of the European Parliament, as "alternative" prize to the Nobel. They honour "those working on practicable and replicable solutions to the real problems facing us today".

4. The energy crisis requires both technological fixes, such as solar energy, and societal restraint fixes, such as limits on the sizes and number of automobiles. The list of actions could go on to include major conservation efforts, better urban planning, encouragement of mass transit, zoning to decrease urban sprawl.

#### ACTIVITY 4

**Read the passages and answer the questions that follow.**

1. The best estimates are that 50% of motor vehicle accidents, which kill more people each year than were killed during all of the Vietnam War, are caused by drunk drivers. In too many such cases the driver is a repeater whose license was not revoked for previous offences, despite a law on the books, by kindly but muddle-headed judge who did not understand statistics.

What may be called "statistical morality" is the precept that a given course of action that may cause some harm to individuals now will result in greater benefit to more individuals in the future. Test of a new drug or vaccine on a limited number of volunteers is one example. A tough law on drunk driving is another. The more we know about risks, whether from drunk drivers or vaccines, the more we will require a statistical morality that ensures the least harm to the most people.

1. What is the statement? How many examples are given to illustrate it?

2. There has always been a two-way traffic of ideas between physics and technology. It is the job of technologists to turn the basic physical ideas into products beneficial to mankind or — if one wants to be a little cynical — into products for which people are willing to pay. Sometimes technology precedes physics as, for example, heat engines were constructed before heat was understood or, giving another example in a field close to us, pulse code modulation was invented well before the birth of information theory. The interaction between light and sound started simply as an exercise in learning more about the properties of both, but very soon after the first successful experiments the idea of practical application was considered. The birth of holography should strictly be attributed to the attempts to improve the resolution of electron microscope, and the end is not yet.

1. Is the opening sentence the main idea of the passage?
2. What statement do the examples illustrate?
3. How many examples are given here? Could there be more?

3. The reasons such a book is needed are clear. The field has expanded so dramatically in the last decade that graduate-level text books cannot keep up. In addition, because of the wide range of specialities related to neutrino physics, it is very difficult for someone new to the field to read the entire current literature without an organised, comprehensive review. This book provides such a review, with references to more specialised publications for those interested in pursuing particular topics. It is just the bridge needed between textbook in nuclear or particle physics and the advanced literature.

1. How many reasons does the reviewer put forward?
2. For whom is the book intended?
3. Who may find it useful?

4. In one way or another, more people study planetary atmospheres than any other aspect of planets. How can such a small fraction of a planet be so important? Three prominent reasons are: the ability of an atmosphere to regulate the thermal regime of the planetary surface or even interior, the tendency of an atmosphere to store information about the dynamic and chemical history of the planet



by being a repository for volatile species, and the likelihood that an atmosphere's composition can tell us about the material from which the planet formed, perhaps even how it formed.

1. Say why the study of an atmosphere is a promising field. Name all the reasons the author gives.

## § 5. HOW TO SUMMARIZE THE MAIN POINTS OF AN ARTICLE

**NE!** *When texts are long, a better way of summarising information is to make an outline. The simplest form of outline moves from the main idea to the details.*

*Main idea → Evidence, support (if any) → Examples or illustration*

### ACTIVITY 1

**Compose a summary of the following passage by underlining the main ideas.**

1. If the cost of usable energy is low enough, all other important resources can be made plentiful. For example, low energy cost would enable people to create enormous quantities of useful land. The cost of energy is the prime reason that water desalination is too expensive for general use; reduction in energy cost would make water desalination feasible, and irrigated farming would follow in many areas that are now deserts. And if energy were cheaper, it would be feasible to transport sweet water from areas of surplus to arid areas far away. Consider another example: if energy costs were low enough, all kinds of raw materials could be mined from the sea.

On the other hand, if there were to be an absolute shortage of energy, that is, if there were no oil in the tanks, no natural gas in the pipelines, no coal to load onto the railroad cars, then our economy would come to a halt. Or if energy were available, but only at a very high price, we would produce much smaller amounts of most consumer goods and services.

The supply of energy is analogous to the supply of other "extracted" raw materials except that energy cannot be recycled: minerals

such as iron and aluminium can be recycled, whereas coal and oil are "burned up". Of course, this distinction is not perfectly clear cut: quarried marble is cut irreversibly and cannot be recycled by melting, as copper can; even cut marble can be used again and again, whereas energy sources cannot.

## ACTIVITY 2

### **Write an outline of this passage.**

Freud is at his best when discussing those seemingly accidental mistakes of speech and writing where one word is substituted for another and, especially, where the substitute

word means the opposite of the word intended. A physician is writing out a prescription for a patient who asks him not to give her big bills because she cannot swallow them — and then says that, of course, she meant pills. An arrogant lecturer says that he could count the number of real authorities on his subject on one finger — he means the fingers of one hand. A President is opening a session from which he fears little good will come and announces that, since such and such a number of gentlemen are present, he declares the session as closed; amid laughter, he corrects his mistake and declares the session as opened. All of these examples clearly derive from the person saying what he actually thinks without checking himself to make his insincere but diplomatic statement. No doubt we have all encountered similar examples in our everyday life. Certainly writers of fiction have long been aware of this phenomenon and have exploited it to good dramatic effect by putting such lapsus linguae into the mouths of characters. In Shakespeare's "Merchant of Venice", for example, Portia has lost her affections to Bassanio but is under a vow not to reveal it. She directs a speech to his welcome suitor in which, throughout, her love for him is thickly disguised and finishes with the words: "One half of me is yours, the other half yours — Mine own, I would say". Her error seems to express her wish.

## **§ 6. HOW TO EXTRACT AND ORDER INFORMATION**

### **ACTIVITY 1**

**Read the short passages below. Answer the questions after them. Your answers should give information that is inferred from the content.**

1. Cancer of the skin is much more common in people who spend long hours exposed to bright sunlight.

1. What do you infer as a possible cause of skin cancer?

2. Proposals for reforming the university are all too often made without stating their overall objective.

1. According to the author, how should proposals for reforming the university be presented?

3. It was thought that once everyone could read the printed word they would keep themselves properly informed of what was going on around them. Events have by no means justified this optimism.

1. Does the author think that people are well informed about what goes on around them?

4. Children of the same or similar intelligence level can be taught together with the same method, regardless of their cultural background, whereas children of significantly different intelligence cannot learn together whether they come from the same or from different cultural backgrounds.

1. Is cultural background a determining factor in education? What is more significant in choosing the method of instruction: intelligence or cultural background?

### **ACTIVITY 2**

**Read the following paragraph. Complete the sentence by using the strategy of inference.**

University education should aim at teaching a few general principles, with the ability to apply them to a variety of concrete details.

Your learning is useless to you until you have lost your textbooks, burned your lecture notes, and forgotten the petty details you memorised for the information at the examination. The ideal of the university is not so much knowledge as power. Its business is to convert the knowledge of a youth into the power of a human adult being.

1. University education should not teach \_\_\_\_\_.
2. Your textbooks and lecture notes cannot help you to \_\_\_\_\_.
3. By "knowledge" the author means \_\_\_\_\_.
4. By "power" the author means \_\_\_\_\_.

### ACTIVITY 3

**The strategy of inference can be used to deduce the main idea of a paragraph. This is especially useful when we are given partial statements that do not include the whole idea of the paragraph or when the paragraph contains only specific details.**

I. The Industrial Revolution changed the life of man. Goods that were once made by hand could now be made by machine, making them cheaper to buy. At first, because of the big factories, many workers were needed, so there were jobs for everyone. But the managers in the factories did not pay much. The cities became crowded, causing bad living conditions, and that brought disease. Soon the towns were full of poor, sick, and jobless people.

**NE!** *The first sentence, although it is a general statement, does not include the main idea (the whole idea) of the paragraph. It is too general in that it mentions change without mentioning that there were both good and bad effects. The rest of the paragraph contains specific evidence of the benefits of the Industrial Revolution and of its negative effects on living conditions in the cities. One could infer the following main idea: supposed benefits of the Industrial Revolution were soon overshadowed by a deterioration in living conditions in the cities.*

### ACTIVITY 4

**From the list that follows the paragraph choose the statement that expresses the main idea. Use the strategy of inference.**

People in the modern age fear sudden catastrophes. They fear the hurricane and the earthquake. They fear nuclear fallout. But few fear

the slow catastrophe that is creeping upon the world through environmental pollution. The air that we breathe in our towns is poisoned. We can stop smoking cigarettes, but we cannot stop breathing, and with every breath we inhale a mixture of dangerous chemicals. It is already a well-known fact that our rivers are dead. Where once children fished and swam, there is nothing but slime and dirt, a breeding place for bacteria. The restful quiet our ancestors enjoyed has disappeared. Even our hearing is slowly being damaged by the level of noise we have to suffer — the noise of planes and heavy tractors. All this is without taking into consideration the “purified” preserved food that we eat, drained of its natural vitamins — with chemical vitamins added to “improve” its value. We may well ask what should we fear more?

1. The modern age is full of sudden catastrophes.
2. Environmental pollution is a more real danger than are sudden catastrophes.
3. Dangerous chemicals should be purified to make today's air safe.
4. The modern age has created problems that never existed before.

## **RELAX NOW**

### **Read the statements and have fun.**

#### **Some Reasons Why Things Go Wrong.**

- If anything can go wrong, it will.
- Nothing is as easy as it looks.
- Everything takes longer than you think.
- Left to themselves, things tend to go from bad to worse.
- Whenever you set out to do something, something else must be done first.
- Every solution breeds new problems.
- It is impossible to make anything foolproof because fools are so ingenious.
- Matter will be damaged in direct proportion to its value.
- When things are going well something will go wrong.
- When things just can't get any worse, they will.
- Any time things appear to be going better, you have overlooked something.

— If you explain so clearly that nobody can misunderstand, somebody will.

— If you do something which you are sure will meet with everybody's approval, somebody won't like it.

— To study a subject best, understand it thoroughly before you start.

— The probability of anything happening is in inverse ratio to its desirability.

— An ounce of application is worth a ton of abstraction.

— No books are lost by lending except those you particularly wanted to keep.

— Once you have exhausted all possibilities and failed, there will be one solution, simple and obvious, highly visible to everyone else.

— Computers are unreliable, but humans are even more unreliable.

— Any system which depends on human reliability is unreliable.

— Machines should work; people should think.

— You cannot successfully determine beforehand which side of the bread to butter.

— An object will fall so as to do the most damage.

— The chance of the bread falling with the buttered side down is directly proportional to the cost of the carpet.

— If the research project is not worth doing at all, it is not worth doing well.

— If the facts do not conform to the theory, they must be disposed of.

— If enough data is collected, anything may be proven by statistical methods.

— When working toward the solution of a problem, it always helps if you know the answer.

— All great discoveries are made by mistake.

— The progress of science varies inversely with the number of journal published.

— There's never time to do it right, but there's always time to do it over.

— No matter how much you do, you'll never do enough.

— What you don't do is always more important than what you do.

— Those who can — do. Those who cannot — teach. Those who cannot teach — administrate.

— The man who can smile when things go wrong has thought of someone he can blame it on.

— If a problem causes many meetings, the meetings eventually become more important than the problem.

— Never argue with a fool — people might not know the difference.

— A good plan today is better than a perfect plan tomorrow.

— To estimate the time it takes to do the task: estimate the time you think it should take, multiply by 2, and change unit of measure to the next highest unit, thus we allocate 2 days for a one-hour task.

— Trivial matters are handled promptly; important matters are never solved.

— The first 90% of the task takes 90% of the time, and the last 10% takes the other 90%.

— In an R&D orbit, only 2 of the existing 3 parameters can be defined simultaneously. The parameters are: task, time and resources.

1) If one knows what the task is, and there is a time limit allowed for the completion of the task, then one cannot guess how much it will cost.

2) If the time and resources are clearly defined, then it is impossible to know what part of the R&D task will be performed.

3) If you are given a clearly defined R&D goal and a definite amount of money which has been calculated to be necessary for the completion of the task, you cannot predict if and when the goal will be reached. If one is lucky enough and can accurately define all 3 parameters, then what one deals with is not in realm of R&D.

— Every revolutionary idea — science, politics, art or whatever — evokes three stages of reaction; they may be summed up by the three phrases:

1) "It is impossible — don't waste my time".

2) "It is possible, but it is not worth doing".

3) "I said it was a good idea all along".

— The only way to discover the limits of the possible is to go beyond them into the impossible.

— When somebody you greatly admire and respect appears to be thinking deep thoughts, he is probably thinking about lunch.

— Any sufficiently advanced technology is indistinguishable from magic.

— There are two types of people: those who divide people into two types, and those who don't.

— Nothing is impossible for the man who doesn't have to do it himself.

— If builders built buildings the way programmers wrote programs, then the first woodpecker that came along would destroy civilisation.

— Beauty times brains equals a constant.

— Anything good in life is either illegal, immoral or fattening.

— Don't care if you're rich or not, as long as you live comfortably and have everything you want.

— Beauty is only skin deep, but ugly goes clean to the bone.

— You can fool all of the people some of the time, and some of the people all of the time, but you can't fool Mum.

— The total amount of evil in any system remains constant.

Hence, any diminution in one direction — for instance, a reduction in poverty or unemployment — is accompanied by an increase in another, e. g., crime or air pollution.

— Men and nations will act rationally when all other possibilities have been exhausted.

— The sum of the intelligence on the planet is a constant: the population is growing.

— Friends come and go, but enemies accumulate.

— To make an enemy, do someone a favour.

— By definition, when you are investigating the unknown you do not know what you will find.

— You can lead a horse to water, but if you can get him to float on his back, you've got something.

— It's better to have a horrible ending than to have horrors without end.

— The only imperfect thing in nature is the human race.

— A pipe gives a wise man time to think and a fool something to stick in his mouth.

— The sooner and in more detail you announce the bad news, the better.

— What the gods get away with, the cows don't.



— The universe is not only queerer than we imagine, it's queerer than we can imagine.

— Man will occasionally stumble over the truth, but most of the time he will pick himself up and continue on.

### **Back to Work Again**

*1. See if you can recognise the structures that you have studied. You've done well if you've identified the following.*

- |                             |  |
|-----------------------------|--|
| — Ved (modifier) — 3        | — S + V + N + Inf — 1                  |
| — Ving (modifier) — 2       | — N + V + Inf — 3                      |
| — Ving (if/when-clause) — 1 | — (that) clause (безсполучниково) — 10 |
| — subject-clause — 1        |  |
| — Inf (modifier) — 5        | — "it" anticipatory — 5                |
| — Inf (purpose) — 4         | — if-clause (unreal condition) — 1     |
| — Inf (result) — 1          | — modals (I план) — 25                 |
| — to be + Inf — 1           | — modals (II план) — 11                |
| — emphasis — 1              |  |

*2. Find the statements that rephrase the sayings:*

- What is worth doing is worth doing well.
- People come and go, but friends stay.
- You can lead a horse to the stream but you can't make it drink.
- You can fool all of the people some of the time, and some of the people all of the time, but you can't fool all of the people all of the time.
- The bread falls with the buttered side down.
- Beauty is but skin-deep.
- He knows which side of the bread to butter.

## **АНАЛИЗ ТЕКСТУ**

### **APE APOTHECARY**

**Self-prescribing chimps lead researchers to nature's medicine cabinet.**

**A.** On most mornings, chimpanzees in Tanzania's Gombe Stream National Park climb down from their nests and head for the

nearest fruit tree. Occasionally, however, they pass up breakfast and travel up to 20 minutes, seeking a particular multistemmed plant. Instead of stripping the plant's stems clean and munching the leaves, as they do with other plants, the chimps carefully remove only the small, young leaves, which they fold and swallow whole, sometimes grimacing like a child taking castor oil.

**B.** For years, behaviour associated with consuming the plant called *aspilia* was a mystery to chimp watchers. Recently, however, researchers may have solved the primate puzzle. The chimps are taking care of their health.

**C.** At least that's the conclusion of Richard Wrangham, an anthropologist at Harvard University, who has meticulously studied primates for almost 20 years.

**D.** *Aspilia* contains thiarubrine-A, a potent compound that appears to help chimps rid themselves of parasites. Chimps, Wrangham says, usually ignore *aspilia*, even when it is close by. When they are sickly, however, they will go out of their way to find it. Chimps often eat the plant at dawn, when the active compound is most concentrated in the leaves.

**E.** As part of her long-term observations of Gombe chimps, moreover, chimp expert Jane Goodall has routinely found intact *aspilia* leaves in chimp dung. It follows, Wrangham theorizes, that the plant is probably not ingested for its nutritional value or for roughage. Instead the leaves, displaying tiny ruptured glands, when viewed under a microscope, seem to release chemicals in the animals guts.

**F.** When Wrangham learned that the local Tongwe people also use various species of *aspilia* to treat themselves for illnesses, the medication theory began to take hold. In 1984 Wrangham sent whole *aspilia* leaves recovered from chimp faeces to Eloy Rodriguez, a pharmacognocist at the University of California at Irvine. What Rodriguez discovered in the leaves "was like finding water on the moon", he says. "The young leaves contain a chemical not found in older leaves", explaining why chimps select only small leaves. Rodriguez subsequently discovered that thiarubrine-A has strong antibiotic properties.

**G.** Studies by other chimp watchers bear out Wrangham's theories about chimpanzees and self-medication. In one study in the

nearby Mahale Mountains Wildlife Research Centre, two primatologists watched a lethargic chimp bypass favourite foods to sample another apparently medicinal plant. In 24 hours she was well again.

**H.** Chimps taking drugs, Wrangham suggests, reinforces the perception that they are the most intelligent of primates. "What we know comes from several different researches involving quite different chemicals", he says, "so it is not a response to a particular chemical; it's a response to the effect of the chemical that seems to be important. In other words, I think the chimpanzees must learn that the effects are good on their stomachs".

**I.** As Wrangham ponders the significance of the primates' behaviour, Rodriguez, intrigued by thiarubrine-A's potency, has continued to test the compound. In vitro tests show that it may have tremendous potential as a treatment against cancer in humans.

**J.** The possibility of discovering other natural drugs by watching animals has led to a new field of study: zoopharmacognosy. Indeed, Harvard researchers have observed bears rubbing medicinal oils on their fur, and an elephant watcher in Kenia notes that pregnant females about to give birth will often go looking for a plant that induces labour.

**K.** Finding potential natural medicines this way clearly adds fire to environmentalists' pleas to preserve threatened wildernesses. Rodriguez, however, is concerned that knowledge gained from such discoveries be put to use in their countries of origin. Thiarubrine-A could be mixed into the feed of livestock in developing countries, making them less vulnerable to parasites. Or it could protect crops.

**L.** "I've also argued for the establishment of regional medicinal gardens in areas where certain lore exists, places where people can just go and get the useful plants", he says.

**M.** To encourage others to think responsibly about natural medicines, Rodriguez and Wrangham have filed a patent for thiarubrine-A, earmarking part of the proceeds for the preservation of the chimpanzees' habitat.

**N.** "I like the idea of chimps showing us the medicine and then helping to pay for their own conservation", Wrangham says.

## Class and Home Activities

### A.

1. Do the chimps stick to their daily routine? Find the textual marker to support your point of view.
2. Find the words showing that the chimps eating habits change *from time to time*.
3. Which of the statements is true?
  - a) Chimps do not feel the taste of their food.
  - b) Chimps are particular about their food.

### B.—C.

4. State the modality of the paragraph. Which of the following sentences is the closest in meaning to "...researchers may have solved the primate puzzle":
  - a) Researchers are quite sure that the puzzle is solved.
  - b) Researchers believe that the puzzle is solved.
  - c) Researchers doubt the fact that the puzzle is solved.

### D.—E.

5. Give an account of asplia effect on the chimps, concentrating on the following:
  - a) the chimps' habitat;
  - b) nutrition and digestion pattern; time-dependence; c) peculiarities of plants.

### F.

6. Find the cause of the development of medication theory.  
Find the English equivalents of: *постійно, звичайно, повсякчас*.
7. Comment on the expression "... like finding water on the moon".
8. Enumerate the known properties of the chemical that is contained in the plant.

### G.—H.

9. The main reasons given by the scientists to prove that chimps are "the most intelligent of primates" are:
  - a)
  - b)

10. The usual procedure for a chimp to take the medicinal plant is:  
a) to try several types and to wait for the effect;  
b) to take the particular plant for the particular sickness at the particular time of the day;  
c) to take any plant at random, because ...  
11. Find the English equivalent of: доказывать.

**I.**

12. Describe the interrelation between the investigation of Wrangham and Rodriguez (simultaneous, the former caused the latter, independent). 12. This paragraph contains a hypothesis or a prediction. Find it.

13. State the main idea of the paragraph.

14. Look through the text and find the sentences supporting this idea.

**J.—N.**

15. The new discovery has opened up new perspectives for various fields of life and science. Name them.

- a) in zoology...
- b) in pharmacology and medicine...
- c) in environmental protection...
- d) in agriculture (livestock)...
- e) in politics and sociology...

State: a) the subject matter of the article; b) the main idea of the article. Find the English equivalent of: *спрямовувати кошти на конкретні завдання*.

16. Translate: **B.—G., J.—N.**

## THE DEEPEST 'DIVE' OPENS NEW WORLDS

**A.** The champagne wouldn't bubble. Soft drink cans collapsed. A cushion floated lazily to the floor. And when anyone spoke, flecks of spittle formed around his mouth. For nearly a month, three volunteers lived under surreal conditions in a diving chamber at Duke University. For 24 hours, they worked at pressures equivalent to 2,132 feet below sea level — more than 100 feet beyond the deepest simulated dive ever before made. They emerged, fit and smiling.

"This achievement is comparable to the landing of the first astronaut on the moon", said Jefferson Davis, president of the Undersea Medical Society.

**B.** The achievement meant far more than a statistical record. It suggested that man could perform useful tasks at depths twice as great as previously thought possible, thus opening up all manner of scientific and commercial possibilities. For instance, many untapped oil and mineral reserves are thought to lie on continental slopes about 2,000 feet below the surface; these now seem within range of human exploitation.

**C.** The "Bends": All deep-sea diving creates enormous dangers. Divers must live in an underwater chamber in which the atmospheric pressure exactly matches that of the ocean outside. They need oxygen to breathe, of course, but at those pressures oxygen becomes deadly. So scientists add helium to reduce the concentration of oxygen. The pressure, however, forces the gas into the divers' bodies. When the men ascend to lower pressures, the helium forms bubbles inside the divers' tissues. This condition, called the "bends", is always painful and sometimes fatal. To overcome the bends, divers must be lowered to renew the increased pressure on them, then brought up much more slowly to sea-level pressure.

**D.** Diving at great depths causes another problem, which the Duke experiment appears to have solved. In earlier simulated descents beyond 1,500 feet, divers suffered combination of nausea, shakiness and fatigue known as high-pressure nervous syndrome (HPNS). Duke physiologist Peter Bennett decided to test a new approach: add nitrogen to the breathing mixture of helium and oxygen. He had found that nitrogen seemed to act as an anaesthetic, reducing the effects of pressure on the brain and nervous system. The difficulty was that at even moderate pressures, nitrogen is narcotic, causing a euphoria that renders divers totally insensitive to danger. Bennett needed a precise dose of nitrogen. In his first test, with 5 per cent nitrogen, divers still showed signs of distress at 1,500 feet. So he gambled on 10 per cent nitrogen for the next descent.

**E.** Drugs: The Duke team took great precautions. The divers, Delmar Shelton, William Bell and Stephen Porter, carried extra oxygen and drugs to offset the danger from HPNS, and scientists monitored them continually. Still, they were on their own. "Once

the divers reach the deeper depth", said the British-born Bennett, "we can't get to them any faster than they went down".

F. The divers didn't need any help. They quickly hit 1,500 feet without any sign of HPNS. Then, after consultation among the three volunteers, lawyers and a university ethics committee, Bennett decided to take the men father down. Two days later, at the simulated 2,132 feet, they celebrated their record with unbubbly champagne.

*Peter Gwynne*

### **Class and Home Activities**

#### **A.**

1. Find the words characterising the surreal conditions (4).

2. These surreal conditions exist:

- a) on the earth;
- b) under water;
- c) on the moon.

Underline the correct answer.

3. Which words prove that these conditions were created artificially.

4. Comment on the statement made by Jefferson Davis.

#### **B.**

5. Which of the following sentences is true:

a) Now it is possible to exploit untapped oil and mineral reserves which lie about 2,000 feet below the surface.

b) Scientists predict that there are untapped oil and mineral reserves lying about 2,000 feet below the surface and that it may be possible to exploit them.

c) Scientists are sure that the existing untapped oil and mineral reserves lying about 2,000 feet below the surface can be exploited.

Find the English equivalents of: *незаймані запаси, удвічі значніший.*

#### **C.**

7. Enumerate the dangers created by deep sea diving.

8. Prove that the procedure described for deep sea diving has no alternative.

9. Find textual marker which shows that adding helium to oxygen is not a remedy and can even be fatal.

**D.**

10. Complete the following sentences:

a) the positive effect of adding nitrogen to the breathing mixture of helium and oxygen is...

b) the negative effect of adding nitrogen to the breathing mixture of helium and oxygen is...

11. Underline the correct answer and explain your choice.

a) The HPNS problem is solved.

b) The HPNS problem is being solved.

c) The HPNS problem is still unresolved.

**E.**

12. Find the textual marker showing that the precautions taken by the team were not sufficient.

Find the English equivalents of: *без підтримки, нейтралізувати небезпеку.*

**F.**

13. Complete the following sentences:

a) it was necessary to consult lawyers because ...

b) it was necessary to consult a university ethics committee, because ...

14. Group information about the results of the achievement given in the article according to the following:

a) scientific aspects;

b) economic aspects;

c) medical and psychological aspects;

d) moral aspects;

e) legal aspects.

15. Formulate the main idea of the article. Translate: **B., C., D., E.**

## FALLOUT FROM AGENT ORANGE

**A.** Vietnam veteran Bob Gibson has his share of old war injuries. They were not inflicted by enemy shrapnel or mortar fire, however, but by the experimental herbicides his Australian Army unit



sprayed on the Vietnamese countryside. "I developed a very bad rash — and it was not your typical jungle rot", says Gibson. More than ten years later, the rash still covers Gibson's face — and doctors have advised him not to have children.

**B.** Richard Brady's wife gave birth to a healthy baby shortly before he left for Vietnam in 1971. Corporal Brady spent most of his tour spraying chemicals with no immediate ill effects. "We just didn't take any notice of the sprays", Brady says, now wishing he had. The four children born since his homecoming have suffered from impaired eyesight, lung problems, skin rashes and heart murmurs.

**C.** If the suspicions of thousands of Vietnam veterans like Gibson and Brady prove to be true, the war's deadliest weapon may have been the American-made chemical defoliant called Agent Orange. Sprayed by the planeload between 1962 and 1972, Agent Orange laid waste to 3.5 million acres of mangrove thickets and rice fields that the Viet Cong were thought to use for camouflage and food crops. Now, soldiers are blaming the poison for their own poor health and their children's cleft palates, club feet and missing fingers. A group called Agent Orange Victims International is suing the U. S. Government for damages, and the Australian-based Vietnam Veterans Action Association (VVAA) has charged the Canberra government with "gross misuse" of the chemical. Hoping to defuse a potential political time bomb, Australian officials announced that they would undertake an unprecedented two-year, \$2 million study of Agent Orange's effects on Australia's 41,000 Vietnam veterans.

**D.** The controversy surfaced earlier when an Australian television crew obtained Vietnamese permission to visit an orphanage in Ho Chi Minh City — formerly Saigon — where nearly 300 Agent Orange victims are said to live. Doctors told reporters that women whose husbands had fought in the south had given birth to children with shrivelled limbs and that others were stillborn, some without brains. Once the telecast was shown in Australia, veterans there began to speak out. Bill Gill, a former helicopter pilot, said that Agent Orange was one of several herbicides used in aerial spraying. A short while later, in an interview on Australian radio, two unidentified army officers confirmed Gill's statement.

**E.** Testifying before Parliament last year, Defence Minister James Killen had stated categorically that "Australian defence forces did not use Agent Orange in Vietnam". Killen recently admitted that a concoction labelled "Knockdown Mixture No. 1" was sprayed around Australian camps for perimeter security. When a legislator asked if one of the four chemicals in the Knockdown Mixture — reglone, gramoxone, tordon or hyvar — was Agent Orange, Killen ducked the question. "As far as I am personally concerned, they could be four horses running at Rosehill [a Sydney racetrack] on Saturday", the Minister replied. Australia's veterans were not amused. "That showed us the government's attitude in a nutshell", said Jim Wares, a veteran whose 1-year-old son Cameron was born with no fingers on his left hand. "There's nothing funny about crippled kids".

**F.** Gas Masks: Killen himself strengthened the veterans' case by releasing two documents showing that strict safety precautions were not taken until Australian soldiers developed chemical-related ailments — ulcers, conjunctivitis and nosebleeds. Goggles and gas masks were subsequently required but seldom used. Former Sgt. Les Dunn, a health inspector in charge of dispensing defoliants and pesticides, recalls that his troops sprayed chemicals from a truck for up to eight hours a day. "I used to watch the blokes getting it all over themselves", says Dunn. "It was hot and sticky and the men couldn't possibly work for eight hours in protective clothing and respirators".

**G.** In an effort to obtain the release of more government documents on biological warfare in Vietnam, Australian veterans demanded a court investigation. But Minister for Veterans Affairs Even Adermann argued that such an inquiry would "not come up with the facts". Instead, the government agreed to interview and examine every Vietnam veteran it could locate — along with their wives and families — and compare them to a control group of 20,000 veterans who did not serve in Vietnam. The Vietnam Veterans Action Association quickly denounced the study as a stalling tactic. "We are bloody furious", said VVAA leader Holt McMinn, a Vietnam veteran whose wife has had four miscarriages. "We wanted to cross examine the government. Now we haven't got a snowball's chance in hell. This inquiry will go on for years".

**H.** Australian Prime Minister Malcolm Fraser hopes he can keep the Agent Orange controversy from hurting his Conservative Party in parliamentary elections. Veterans suspect that Fraser — as Minister of the Army and, later, Minister of Defence during the time — has the most to hide. “Fraser knows he would be vulnerable if we start forcing documents out into the open”, says McMinn. Intending to do just that, McMinn’s organisation filed the first of an expected 4,000 Agent Orange suits against the Australian Government and the country’s chemical companies. Like the war itself, Agent Orange may prove to be an issue that will not soon go away.

### **Class and Home Activities**

#### **A.**

1. Find in the paragraph the words explaining the expression “old war injuries”.
2. Underline the correct answer.  
The cause of the injuries was:
  - a) shrapnel fire;
  - b) mortar fire;
  - c) herbicide.
3. Which of the statements is true:
  - a) herbicides were sprayed by the Vietnamese;
  - b) herbicides were sprayed by the Australians;
  - c) herbicides were sprayed by the Americans.

#### **B.—C.**

4. Give a short account of the effects of the herbicide spray both on people and land.
5. Find in the paragraphs the proof to one of the statements:
  - a) soldiers were aware of the harmful effect of the defoliant;
  - b) soldiers knew nothing about the possible results of their spraying the defoliant.
6. Explain the expression “to defuse a potential political time bomb”.

Find the English equivalents of: *шум у серці, повернення додому, поганий зір, зруйнувати, клишавість, бомба зуповільненої дії.*

**D.—E.**

7. What does the word “the controversy” stand for?

8. What made Australian veterans speak out?

9. Prove that Australian government is not at one with the veterans as concerns the affect of Agent Orange on people.

10. Both the officials and the veterans admit that defoliants were sprayed in Vietnam. Where does the controversy start?

**F.**

11. Enumerate the facts that may be used as evidence strengthening the veterans’ case against the Government.

12. Prove that the officials were aware of the violations of strict safety precautions.

**G.**

13. Find the textual marker showing that a court investigation would not be successful.

14. What alternative is suggested by the Government? Find the marker.

15. Complete the following sentence:

The Australian veterans agreed/disagreed with it because:  
a); b); c).

**H.**

16. State the main idea of the paragraph.

17. Complete the following:

a) The political aspect of the Agent Orange suits against the Australian Government is...

b) the moral aspect of it is ... c) the pragmatic aspect of it is ...18.  
State the main idea of the article.

19. Divide the article into several logical parts and entitle them.  
Translate: **C., D., E., F.**

## THE CASE OF PHILLIP BECKER

**A.** The Supreme Court’s refusal to hear California’s appeal means Phillip Becker’s parents have successfully asserted a right to block life saving surgery. So Phillip, 13, will die prematurely, probably slowly and painfully, perhaps suddenly, drowning in his blood

from bleeding into his lungs. Surely, the reason his parents have promoted, and the law has allowed this, is he is retarded.

**B.** He has Down's syndrome (Mongolism), a chromosomal defect that involves varying degrees of retardation and physical abnormalities. He has a common heart defect, correctable by standard surgery. Uncorrected it probably will kill him by 30. The pattern is progressive debilitation until reduced to a torturous bed-to-chair existence, with headaches, chest pains and fainting spells during which the sufferer turns a terrifying blue-black. Already Phillip suffers attacks of weakness and blueishness. His heart must work three times harder than a normal heart. Blood is pumped into his lungs under dangerously high pressure, damaging the lungs' thin vessels. Already he may have passed the threshold of dangerous harm; soon his condition may be inoperable, his decline irreversible.

**C.** California, which would have paid, called the surgery a "necessity of life". The Beckers responded with three inharmonious arguments. They said the operation was too risky. There are special risks in surgery with Down's children, but the risk of death in Phillip's case was well within conscionable range, even when not weighed against the awful alternative certainty. Anyway, the Beckers simultaneously argued against surgery because of fear it would succeed. They said they feared he would survive them and, bereft of their attention, might someday receive care so poor that life would not be worth living.

**D.** Worthless Life? Although they assert a right to make it probable that Phillip will predecease them, they never considered allowing him to live at home. They say he "is an integral part of our family", but only claim to visit him six times a year. The home for handicapped children says the visits are even fewer, that "Phillip doesn't know who his parents are", and that he calls many men "Dad". For years his parents have fought a partial and temporary severance of their autonomy over a child they never even brought home from the hospital and rarely see. What might have been accomplished if the energy devoted to abbreviating Phillip's future had been devoted to providing for it?

**E.** However that may be, the Beckers' argument against surgery on the ground that it might mean Phillip might someday lead a life not worth living was superseded by their third argument: that his

life is inherently not worth living. They solicited a letter from a paediatrician who said that Phillip leads "a life that I consider devoid of those qualities that give it human dignity". He said Phillip's "simple and innocent nature" makes him a "natural victim" of people bent on "taking his money". Phillip might not "fit into modern suburban society".

**F.** A man who talks like that should not announce that someone else is deficient in dignity. I yield to no one in my reverence for paediatricians when the subject is tonsils and the like, but is paediatric medicine definitive on the subject of human worth? I will not speculate about the worth of those who presume to deprecate Phillip's worth, or about the quality of life in a society that, on "quality of life" grounds, truncates a life like Phillip's. But this is tiresome: just when society is beginning to acknowledge an obligation to nurture the significant fulfilment of even the limited potentialities of retarded citizens, the Becker case works to cast those citizens into legal limbo as less than persons with a full right to life.

**G.** My aim is not to demonstrate the demonstrable: that respect for parental sovereignty has here been carried to absurd, not to mention lethal, lengths, unthinkable were Phillip not retarded. (There even has been court-ordered treatment, against parents' wishes, of deformities that threatened not the lives but only the psychological well being of normal children). My aim is to stress this: the idea that the value of human life varies with intelligence is an idea at war with our civilisation's core belief in the intrinsic and equal value of lives.

**H.** Down's newborns have been allowed to starve to death in hospitals by parents who refused consent for surgery to correct intestinal blockages. In "The Making of a Surgeon", William Nolan recalls a surgeon saying to a paediatrician that he wouldn't worry if a particular patient died during upcoming surgery. The paediatrician replied, "Oh, now I get it. You're doing Mongoloid". The Beckers testified that one reason they never considered allowing Phillip to live with them is that they did not want him to be a "burden" to his brothers. One reason they blocked the operation was fear that his two brothers might have to be their brother's keeper.

**I.** It is often said that someone "suffers from" Down's syndrome. But Down's people lead happy lives when parents and 85 other

friends allow their own lives to be enriched by loving and being loved by them. The suffering Phillip faces is premeditated and preventable, so let there be no mincing euphemisms about "passive euthanasia". Euthanasia means "pleasant death", a release from suffering. Phillip's *life* is pleasant.

**J.** A Boy: People ignorant about retardation, or eager to believe the worst, often produce excessively pessimistic prognoses about retarded children's potentialities. Those prognoses become self-fulfilling, even fatal, when used to justify neglect. Those who know Phillip best consider him gentle and promising. His teacher says that he is "working at a very high level" for any retarded child. He assembles Legos and operates a recorder. If allowed to live, he could work in a sheltered workshop and live in a supervised group home with other retarded adults. He is in a Boy Scout troop. He makes his bed, feeds the cat and does other chores where he lives. His taste in TV shows runs to "Six Million Dollar Man".

**K.** The Down's child I know best is 7. He is learning to read but prefers "Happy Days", the Washington Bullets and the Baltimore Orioles. These impeccable tastes help explain why neighbourhood children treat him as what he, like Phillip, is: a boy.

### **Class and Home Activities**

State the main idea of the article.

**A.**

1. What will be the immediate result of the decision of the Supreme Court.

2. Complete the following:

- a) The positions of the sides in the Court were ...
- b) California's appeal was ...
- c) his parents claimed ...

**B.**

3. Find in the text the proof to one of these contradicting statements:

a) Phillip's heart defect is one of the manifestations of Down's syndrome and thus it cannot be corrected.

b) Phillip's heart defect is not connected with Down's syndrome and can be corrected.

4. Complete the following sentence using the information from the text:

The decision about the operation should be taken immediately because ...

5. Find in the text the comparison of work of a normal heart and that of Philip.

**C.**

6. Which sentence in the paragraph proves that California's desire to save the child was strong enough and well-calculated.

7. What does the phrase "the awful alternative certainty" stand for? Find the explanation in the above paragraphs.

8. Is there any implicit logical contradiction in the last sentence.

**D.**

9. What is the correlation between the Beckers words and deeds. Find the textual marker to prove your point of view.

10. What type of modality is expressed in the last sentence?

- a) assurance,
- b) supposition,
- c) unrealised potential.

**E.**

11. Enumerate the Beckers' arguments against surgery and quote the argument they consider the most important.

13. Is the meaning of the word "dignity" the same in E and F?

**F.**

14. Which of the statements is true?

- a) The attitude of the Beckers towards retarded citizens coincides with that of the society.
- b) The attitude of the Beckers towards retarded citizens is quite different from that of the society.

**G.**

15. What in the author's view makes the decision taken by the Court concerning "parental sovereignty":

- a) possible;
- b) absurd

Find the English equivalent of вступати в протиріччя.



16. Find the sentence expressing the main idea of the paragraph.

**H.—I.**

17. What is the connection between the ideas expressed in paragraphs H. and F.

18. The ideas expressed in the paragraph may be considered an answer to some ideas expressed above. Find these ideas.

19. The word “life” is in italics. What does the word imply?

20. What characters of the article can be called “ignorant” about retardation?

**J.—K.**

21. Find in the text what stands behind or explains the meaning of “excessively pessimistic prognoses”.

22. Find in the paragraph the proof to one of the following statements:

a) children’s attitude towards Down’s children is the same as that of the society as a whole.

b) children treat Down’s children as their equal.

23. Translate: **B., D., F., G.**

## **FRAUD IN A HARVARD LAB**

### **“Gifted” researcher is punished for faking data.**

**A.** “Dr. Darsee is clearly one of the most remarkable young men in American medicine. It is not extravagant to say that he became a legendary figure during his years as chief resident in medicine at Grady Memorial Hospital”.

**B.** With that exuberant commendation, Cardiologist Paul Walter of Emory University endorsed the selection of his former colleague John Darsee for one of the biggest plums in academic medicine: an appointment to the Harvard Medical School faculty. Darsee’s career to that point had been a non stop flight from modest origins in Huntington, W. Va., to professional glory at the age of 31 as a research fellow at Harvard. Arriving in 1979, he performed brilliantly, producing five papers in 15 months, all published in major journals. In 1981 Dr. Eugene Braunwald, an eminent cardiologist at the university, began action to place Darsee on the faculty.

**C.** Yet by the time all the letters of recommendation were in, the offer had been withdrawn and Darsee's spectacular career was unravelling. The young man, who is still called "brilliant and creative" by former colleagues, had been caught faking research data.

**D.** The National Institutes of Health released the results of a yearlong investigation into Darsee's misconduct; it announced that he would be barred from receiving federal grant funds and contracts for ten years, the harshest penalty for fraud it has ever imposed. The NIH report not only documented Darsee's abuses at Harvard, but also raised serious doubts about the veracity of research he had carried out earlier at Emory.

**E.** The NIH also sharply criticised Darsee's supervisors at the Harvard-affiliated Cardiac Research Laboratory at Brigham and Women's Hospital for failing to report promptly their initial suspicions about Darsee's work. The young researcher was assigned to a project funded by the National Health, Lung and Blood Institute and aimed at developing animal models for assessing the effectiveness of drugs used to treat heart attacks. Charged NIH Associate Director William Raub: "A large and costly study of great importance for a major public health problem was irrevocably compromised". Harvard was asked last week to return the \$122,371 it had received to fund the study.

**F.** Suspicions about Darsee's work first arose in May 1981, when he was pursuing another project. Tipped off by two other researchers, Laboratory Director Robert Kloner found that Darsee had been faking dates on reports to make a few hours' work look two weeks' worth of data. Kloner informed Braunwald, who terminated Darsee's fellowship and notified Medical School Dean Daniel Tosteson. But Braunwald accepted Darsee's plea that this was his sole offence. Unwilling to destroy the career of what he called "an apparently brilliant researcher", Braunwald did not inform NIH officials. Instead, he and Kloner conducted their own audit of Darsee's work and supervised him closely during the next few months. They uncovered no evidence of further misconduct.

**G.** According to the government's report, they did not look hard enough. In October, when the results from all five centres involved in the N.H.L.B.I. study were released, it was clear that the Harvard data were inconsistent with the rest. Only then did Braunwald and

Kloner inform NIH officials about the incident in May. Investigations into Darsee's work were formally initiated by both Dean Tosteson and the NIH. Meanwhile, Braunwald and Kloner redoubled their efforts to unmask the fraud. Said Braunwald last week: "We began to think like Sherlock Holmes".

**H.** The medical detectives found a number of abuses. Darsee had recorded data from tests on dogs that required the injection of radioactive substances and the excision of the animals' hearts. Yet Braunwald and Kloner discovered from tissue samples that the animals had never been injected, and at least one of the dogs had been buried with its heart intact. The NIH found that all measurements made by Darsee were so perfectly consistent and neat that they "lack credibility".

**I.** While NIH officials recognised that "no system of procedures and controls can offer absolute protection against wilful deceit", they criticised Kloner and Braunwald for not paying close enough attention to the researcher under their supervision. Though Braunwald strongly denied the charge, the report maintained that "a hurried pace and emphasis on productivity, coupled with limited interaction with senior scientists, have contributed to the disappointing events".

**J.** In recent years there has been a growing number of such "disappointing events" in laboratories around the country. Yale, Cornell and Boston University have each had to contend with embarrassing cases of scientific fraud. According to a number of scientists the tremendous pressures to "publish or perish" may be a factor in the trend. These pressures have been exacerbated by the intense competition for limited federal research funds. "Science is more expensive these days", says Albert H. Hastorf, Stanford's provost. "You need a big grant or you are out of business". Many leading research institutions have attempted to deal with the problem by tightening up procedures for handling cases of suspected fakery.

**K.** As for Darsee, he maintains that he has "no recollection" of committing the abuses. Last week, however, he issued a statement "asking forgiveness for whatever I have done wrong" and asserting, "I want to continue to contribute to the medical system". He is currently in the first year of a two-year fellowship in critical-care medicine at Ellis Hospital in Schenectady, N. Y. He does no research.

According to Hospital Spokeswoman Pat Mattice, Darsee had been "completely honest" in describing his past, and "we feel he has a lot to offer".

*By Claudia Wallis*

### **Class and home activities**

#### **A.**

1. State the main idea and purpose of the paragraph.
2. Give the Russian equivalent of the word "extravagant".

#### **B.**

1. Name the main steps in Dr. Darsee's career.
2. What does the phrase "that exuberant commendation" stand for?
3. The attitude of Cardiologist Paul Walter of Emory University to his former colleague John Darsee is as follows:
  - a) Walter envies Dr. Darsee's success in science;
  - b) Walter praises Dr. Darsee's achievements and talent;
  - c) Walter thinks that Dr. Darsee is a bad scientist.
4. Account for the meaning and give the Russian equivalent of "one of the biggest plums in academic medicine".
5. Which of the following statements is true? a) Darsee was invited to work on the faculty because there was a vacant position of a research fellow.
  - b) Darsee applied for getting job on the faculty.
  - c) Somebody wanted to help Darsee to start working on the faculty.

#### **C.**

What is the logical relationship between paragraphs B. and C.? Find the textual marker to prove your point.

6. Find in the paragraph the reason for the withdrawal of the offer.
7. Did Darsee's colleagues change their attitude to his intellectual potential?

#### **D.—E.**

8. What Darsee's activities are called misconduct?
9. The penalty imposed on Darsee is: a), b), c).

10. Prove that Darsee's case ceased to be only his personal problem?

**F.—G.**

11. Drs. Braunwald and Kloner decided not to inform NIH officials because:

a) they terminated Darsee's fellowship, and notified Medical School Dean;

b) they accepted Darsee's plea;

c) they didn't want to destroy his career; d) they decided to conduct their own audit of Darsee's work and supervise him closely.

12. Complete the following sentence: Drs. Braunwald and Kloner had to change their decision because ...  
13. Account for the meaning of "We began to think like Sherlock Holmes".

**H.—I.**

14. What psychological mistake was made by Darsee in faking the data?

15. Find the contradictions, if any, between NIH and Braunwald's points of view concerning the protection of science against "wilful deceit".

16. What "charge" did Braunwald deny?

**J.—K.**

17. The appearance of faked data and fraud was caused by two factors. Name them:

a) pragmatic factor \_\_\_\_\_;

b) ethical factor \_\_\_\_\_.

18. What are the possible ways out of the current situation?

(You may give your own point of view).

19. Describe Darsee as a scientist using both characteristics given by his fellow-scientists and your own opinion.

20. What do you think is the purpose of the article?

21. Find in the text the English equivalents of: *відсторонити від участі, повірити завірянням, розслідування, не виглядали правдивими, безсторонній, мати великий потенціал, обман, підробка, підтасовка даних.*

22. Translate: **C., F., J., K.**

## MONUMENTAL EFFORT IN JAVA

### **An international team helps salvage a Buddhist treasure.**

**A.** The giant stepped pyramid rises eerily out of the lush rice fields of central Java, like some forbidden city in the sequel "Raiders of the Lost Ark". Bristling with statuary and turrets, the imposing edifice sits in stony silence in the gathering light of dawn. But this is not a Hollywood fantasy. It is Indonesia's Borobudur, the world's largest and probably most mysterious Buddhist monument, which will be rededicated as a national shrine and tourist attraction after being rescued from decades of neglect.

**B.** Built around 1,200 years ago, Borobudur (usually translated as "temple on the hill") is architectural jewel that Historian Arnold Toynbee ranked as the equal of the Parthenon. Very little is known of the people who built and used it, or of the reasons it was permanently abandoned in 1006 after an earthquake and the eruption of the nearby Merapi volcano. Covered with some two miles of bas-reliefs that depict the life of Buddha and the sacred stories of Buddhism, Borobudur is a source of immense national pride to Indonesia, even though Islam is now the religion of more than 95% of its people.

**C.** Carved of gray-brown volcanic stone, Borobudur consists of a large platform, roughly 400 ft. on each side, surmounted by a wedding cake of five progressively smaller square terraces. These are topped by three circular layers. Crowning the entire structure is a bell-shaped stupa. Dozens of statues of Buddha line the balustrades on each level. Ancient Javanese architects, under Hindu influence, designed Borobudur as a model of the Yahayana Buddhist cosmos; the various levels represent the ascending stages of enlightenment that must be passed before nirvana, or spiritual freedom is reached.

**D.** For some eight centuries, the site was overrun by tropical growth, shaken by quakes and ashed by monsoon rains. Still, when the British Lieutenant Governor of Java, Thomas Raffles, rediscovered the ruins in 1814, he was sufficiently impressed to order a cleanup of the stone pyramid. The Dutch, who regained Java from the British in 1816, continued the custodial work, which culminated in a major restoration after the turn of the century, but their well-

meant efforts failed to stem continuing damage from tremors and poor drainage.

**E.** By the 1960s, Borobudur's foundation was so badly weakened that the entire structure was in danger of collapse. Some of the balustrades were listing as much as 11° because the artificial hill on which the temple sits had settled. Algae, fungi and lichens were eating away at porous stone, obliterating the exquisite carvings. An alarmed Indonesian government appealed to the United Nations Educational, Scientific and Cultural Organisation (UNESCO) for international help to save the monument.

**F.** No other archaeological rescue of such magnitude had been attempted since UNESCO's raising of the Egyptian temple of Abu Simbel in 1966 to protect it from the flood waters of the Aswan dam. Consultants from a variety of disciplines, from architecture to soil mechanics, concluded that halfway measures would no longer do; a major rebuilding had to be undertaken. To arrest the "stone cancer", as experts call it, the temple's entire middle section was removed, a job comparable to taking out the centre of a layer cake without causing a collapse. With the help of a computer contributed by IBM, each of the 1,300,232 stones was catalogued, then cleaned and chemically treated before being returned to its place. Thousands of stones that had tumbled down over parts of a broodingnagian jigsaw puzzle, were put into their proper niches. Even local mystics were consulted, along with the computer, to find where the stones belonged. (Sadly, 54 of the Buddha heads still have not been matched with 258 headless Buddha torsos.)

**G.** More important was ensuring the temple's structural integrity, continually threatened by Java's heavy rains. Under the leaning balustrades went reinforced concrete slabs. To prevent water from undermining the hill upon which Borobudur sits, the engineers installed hidden drainpipes to replace the gargoyle spouts provided by the ancients. Finally, gravel, tar, epoxy and lead were layered under the stones to protect them and the foundation from seepage. Says Indonesian Archaeologist Soekmono, 60, known among his countrymen as the Guardian of Borobudur: "The structure is engineered to last another 1,000 years".

**H.** The reconstruction took a decade of effort and cost \$25 million. Located 30 mile from the Javanese city of Jogjakarta,

Borobudur is eventually expected to attract several million visitors a year. At this week's ceremony, Indonesian officials, as well as representatives of UNESCO and 28 contributing nations and corporations, will gather at the temple for the local equivalent of a ribbon cutting. Even if the donors do not achieve nirvana as they climb Borobudur's refurbished steps, they can take pride in setting an example for all the world to emulate in the care of a noble relic of the distant past.

### **Class and home activities**

#### **A.**

1. Find the words used by the author for the description of Borobudur.
2. What made the rededication of the monument possible?

#### **B.—C.**

3. Describe the monument in your own words.
4. Which of the following statements is true:
  - a) the monument is a national shrine for Buddhists;
  - b) the monument is a national shrine for Islamists;
  - c) the monument is a national shrine for all the people of Indonesia;
  - d) the monument is a shrine for the people all over the world.
5. What in the monument reflects the ideas of Buddhism?
6. What is the influence of nature on the monument?
7. What was the starting point for the efforts to restore the monument?

#### **D.**

8. Which of the following statements is true?  
The efforts to restore the monument started:
  - a) because it is a usual procedure with each rediscovered monument;
  - b) because the Government was interested in it ;
  - c) because the Buddhists asked for it.
9. What did the restoration result in?
10. What necessitated the appeal of Indonesian government to UNESCO?



**F.**

11. What do the two monuments (Borobudur and temple Abu Simbel) have in common?

12. What efforts are termed by the specialists as "halfway measures"?

13. Did the use of the IBM computer solve all the problems of the rebuilding?

**G.**

15. What endangers the integrity of the monument?

16. The structure is engineered to last another 1,000 years because: (give your arguments).

**H.**

17. Complete the following sentences:

a) the pragmatic aspect of the reconstruction of the monument is...

b) the ethical aspect of the reconstruction of the monument is...

18. What is the main purpose of the article? Translate: **A., D., F., H.**

## PROMOTING WOMEN AT WORK

**A.** Employers committed to specific increases in the number of female employees form only an eighth of those involved in a new initiative, to be launched by the Government to improve the role of women in the workforce.

**B.** Sixty-one employers were announced as the first wave of campaign companies taking part in Opportunity 2002, an unprecedented initiative on employing women.

**C.** The campaign, promoted by Business in the Community, the specialist on corporate community investment, stresses the value of making better use of women in business. Led by company chief executives, it is backed by all the major business organisations, including the CBI, the chambers of commerce and the Institute of Directors.

**D.** Women currently comprise only about a fifth of British management and hold less than 2 per cent of senior executive posts,

despite the fact that by the year 2000 they will make up more than half the UK workforce.

**E.** Though Opportunity 2002 leaders stress that employers taking part in the campaign are aiming at a range of goals tailored to their own individual needs, the small number of companies prepared to commit themselves to specific numerical targets — only eight of the 61 — will raise doubts over goals being set.

**F.** The eight companies are NatWest, Kingfisher, BBC, British Airways, LTW, Rank Xerox, Chartered Institute of Management Accountants and Ashridge Management College, the business school which assisted Business in the Community to set up Opportunity 2002.

**G.** None of the other companies and organisations involved are setting specific targets. These include Marks and Spencer, the NHS, Royal Mail, J Sainsbury, BT, Shell UK and the Cabinet Office — in effect, the entire civil service.

**H.** Opportunity 2000 leaders emphasise the importance of the goals employers are setting themselves being both achievable and measurable, but some are extremely loose and unspecific.

**I.** The shortest target, for instance, is being set by Glaxo, the chemical company, whose target in full is: "Glaxo is fully committed to Opportunity 2000 and to achieving its objectives. Glaxo is currently reviewing very actively how best their support for the campaign should be taken forward within the company".

**J.** Lady Elspeth Howe, who chairs Business in the Community women's economic development target team, said the importance of the initiative was the companies committing themselves to goals, rather than numeric targets: "The companies involved have set themselves goals within their own cultures that suit their own business needs".

*Dy Phillip Basset*

### **Class and home activities**

#### **A.—C.**

1. State the topic of the paragraphs.
2. Find the sentence that proves that British women do not have equal rights with men in the sphere of employment.

3. The campaign Opportunity 2002 is launched and promoted by:

- a) the employers;
- b) certain companies;
- c) the Government;
- d) the women struggling for equal rights with men.

4. What does the word "initiative" stand for?

5. Opportunity 2002 has two main aspects: pragmatic and moral.

Speak on both.

6. What is led by company chief executives and backed by business organisations?

7. Find in the paragraphs the major spheres of women's future activities.

**D.**

8. Is there any contradiction in the sentence? Find the textual marker.

**E. – G.**

9. Which of the statements is false?

- a) all the employers pursue one end;
- b) not all the employers pursue one end.

11. What does "these" stand for?

12. What is meant by the entire "civil service"?

13. State the main idea of these paragraphs.

**H.**

14. How do the Opportunity 2002 leaders characterise the goals being set?

15. Which of the attributes given above characterise Glaxo's target best of all?

16. Follow the words "goal" and "target" throughout the text and state whether they are synonyms in this context?

**J.**

17. Which sentence in the paragraph echoes or supports the idea expressed in E.?

18. Find the English equivalents of: ставити завдання, неконкретний (2), строго дотримуватися.

19. Translate: **D., E., J.**

## THE HAZARDS OF ORBITAL FLIGHT

**Nausea, fatigue, higher pulse rates are a few of the dangers.**

**A.** The space shuttle Challenger, its maiden flight twice rescheduled, sat on its Florida pad. Gas leaks had been discovered in both an original engine and its replacement. But for the next group of astronauts, mechanical foul-ups are only one worry. Today's space travellers have an additional concern: the body's reactions to zero gravity.

**B.** U. S. Astronauts Bill Lenoir and Bob Overmyer experienced nausea and vomiting during the fifth flight of the Columbia. Lenoir's distress helped force changes in planned space tasks during the five-day mission. Space sickness, renamed by NASA "space adaptation syndrome" (SAS), was recognised only a decade ago. Says former Astronaut Mike Collins: "We didn't have much of a problem with space sickness as long as we were strapped in Mercury and Gemini. Same for the Russians. It's when we all began floating around in Skylab and the Russians in Salyut that the guys began getting sick".

**C.** Between 30% and 50% of space voyagers develop SAS, usually in the initial days of a flight. It is not yet possible to determine who is susceptible. Scientists believe the malady is caused by the body's struggle to adapt to the absence of gravity and to disorienting shifts in body positions. As a result the brain receives conflicting information from the eyes and the inner-ear system, which registers pressure changes and affects balance. Says Dr. Phillip Johnson, chief of the medical-research branch of the Johnson Space Center in Houston: "In space you receive a lot of novel input into the brain, which doesn't know how to handle it. We just have to adapt. Some people adapt rapidly, some slowly. It's like going out on a boat with a lot of people. Some will get sick and others will be just fine".

**D.** NASA is pressing for a cure because SAS can disrupt short-term flights. As a temporary remedy, astronauts routinely take along pills containing a combination of scopolamine, a drug that blunts sensations, and dextroamphetamine, a stimulant to counteract scopolamine's dulling effects on the body and mind. When the pills failed to help Lenoir, NASA's chief flight surgeon Sam Pool advised from Houston ground headquarters that Lenoir also take Phenergan, an antihistamine, and Dalmane if he needed a sleep medication. But the combination of potent drugs is not an ideal solution

since it can impair coordination and judgement. According to an Air Force surgeon at Andrews Air Force Base, any military or commercial pilot on such medication would automatically be grounded. Says he: "Before you fly, that stuff has got to wash out of your system". To learn more about SAS, NASA will be sending physician-astronauts on the next three shuttle flights. They will study the relationship between the eyes and inner-ear system, and the effects on the body of inertia and weightlessness.

**E.** SAS is a minor irritation, however, compared with the hazards of long-term space flight. Cosmonauts returned from such flight in obviously debilitated condition. Even though they had exercised daily, the prolonged weightlessness left their muscles so flabby that for a week they were barely able to walk.

**F.** Muscle atrophy is a visible effect of long space flight, but there are less obvious dangers. All are related to lengthy stays in zero gravity, though scientists do not fully understand why all the changes occur. Bones lose one-half of 1% of their calcium each month. Some body fluid shifts from the extremities to the chest and head: a portion of the fluid is excreted. Fatigue sets in, and sound sleep becomes elusive. The heart's size shrinks by 10%. Astronauts exercising on land after a flight have a higher pulse rate than they did before journeying into space. "We think it takes only 48 hours in space for this change in the heart to take place", says NASA's Johnson. The heart apparently returns to normal within a year of returning to earth.

**G.** In the Soviet Union, the Beregovoy — Lebedev mission has sparked a rare public debate over one major question: How long can a person stay aloft before suffering irremediable harm? Cosmonaut Valeri Ryumin, who had set earlier flight records by orbiting the earth for 175 and 185 days, believes the safe limit has been breached. Says Ryumin, now a senior program chief outside Moscow: "It appears to me that four months is the optimal period".

### **Class and home activities**

#### **A.**

1. What are the body's reactions to zero gravity?
2. Find the sentence expressing the main idea of the paragraph?

**B.**

3. Space adaptation syndrome means ...

4. Under what conditions does SAS develop?

5. Find in the paragraph the main causes of SAS.

6. Which of the statements given below are false?

a) Whenever an astronaut goes on a space mission, he develops SAS.

b) Development of SAS is not connected with the duration of the flight.

c) Development of SAS depends upon the duration of the flight.

**C.**

7. How does the author account for the difference in susceptibility of various people to SAS.

**D.**

8. The main points of NASA anti-SAS programme are: a), b), c).

9. Find in the text the sentence that proves that using such types of medication can have both positive and negative effect on the astronaut.

10. Find a Russian equivalent to "a pilot would be grounded".

11. What is the topic of D?

**E.—G.**

12. Find the sentence expressing the main idea of the paragraphs.

13. Can you prove that weightlessness has a hazardous effect on the whole organism of an astronaut? Give five reasons.

**G.**

14. How would you comment on Ryumin's statement?

15. What is meant by the "optimal period"?

16. Divide the text into two parts and entitle them. Translate: A.,

**D., F.**

17. Find in the text the English equivalents of: перший політ, несправність, "космічна" хвороба (cf.: seasick), новий, притупляти (2), центр наземного керування польотами, ліки (2), організм, небезпека (2), встановити рекорд.

## THEY ROLL THEIR EYES AND GROAN

*at the mention of science, but with an enlightened approach  
we can recapture students' curiosity*

**A.** An entire generation of students is losing interest in science and scientific careers. Although we hear constantly of the competitive and national security consequences of this decline, science education continues to plummet.

**B.** Preparation for a scientific career is not the purpose of elementary and high school science classes. Even in the most scientifically enlightened times, most students do not become scientists. They do, however, possess the ability to learn about science and to carry that learning throughout their lives. And an understanding of science and the scientific process is one that will serve an individual well, whatever professional path he pursues.

**C.** You don't have to be a particle physicist to be curious and informed about the nature of matter. Few frontiers are expanding as dramatically as those in biology, yet most students express little interest in the fundamental processes of life. The history of science is filled with individuals and events as dramatic as any human endeavour, yet those individuals and events are all but invisible to kids.

**D.** Science test scores are declining. Yet those very test scores are at the heart of the problem. From the earliest grades, students are prodded to perform rather than inquire, to get good marks rather than grasp ideas, to recite rather than reflect. SAT and other standardised scores count far more in the minds of most students — and the minds of too many school administrators — than comprehension.

**E.** The mentality that drives the overwhelming emphasis on standardised test performance is the same one that hampers and hamstringing our science teachers. The architecture of too many school systems rest upon compartmentalisation, curriculum guidelines that assign so many weeks to physics, so many to chemistry, and so on. In the upper grades, students elect a scientific discipline for a semester or two, then move on, forgetting the facts.

**F.** It doesn't have to be this way. Young children have that scientific cast of mind that asks, constantly, why and how. They want to learn, and for a time their curiosity is insatiable. Our educational

process, however, seems designed to squelch that curiosity and replace it with drudgery.

**G.** This is not, as a rule, the teachers' fault. They work long hours for low pay, their own excitement and energy sapped by the compartmentalisers. Many science teachers find themselves locked into dull, bland textbooks required to march through a set number of pages on a predetermined schedule, with little opportunity to innovate, to communicate, to educate.

**H.** Those same teachers know that science is a process of asking questions, but those questions need to be placed in a context. That context needs to extend beyond the covers of state-selected texts, must extend, in fact, as far as the partnership between teacher and student can go. And the context must spark students' imaginations by showing how science touches their lives.

**I.** Broadcaster and geneticist David Suzuki once made a bold suggestion: since teenagers tend to have sex on their minds, build high-school science courses around biology, specifically around sex and sexuality. From this admittedly interesting starting point, science teachers could move throughout all of the scientific disciplines — holding on to students' interest all the while.

**J.** Other inherently interesting contexts offer opportunities: space, athletics, the environment, the information revolution. You could build a broad science course from the lives of scientists. One can envision science courses constructed around the physics of video games, television, the arts, even science magazines like *Omni*. Teachers have their own, doubtless, better ideas.

**K.** H. I. Wells pointed out that civilisation is engaged in a race between education and catastrophe. Today catastrophe seems to be winning, at least in science education. To reverse the trend requires a large effort by individuals, corporations, publications — one that will repay us a thousandfold, and more quickly than we might imagine.

**L.** Science is entertaining, and at its best, that entertainment is glorious. The challenge is to liberate our teachers from artificial restraints that arbitrarily measure accomplishment, freeing them to show students the glorious entertainment that can be found in science.

*By Keith Ferrell*



## **Class and home activities**

**Underline the correct answer.**

The decline of interest in science is characteristic of

- a) pupils;
- b) students in general;
- c) science students;
- d) scientists.

**A.**

- 1. Find the sentence expressing the main ideas of the paragraph.
- 2. Is there any contradiction in A. Find the textual marker.
- 3. Give synonyms to "science education continues to plummet".

**B.**

- 4. What are the purposes of elementary and high school science classes?
- 5. What is the outcome of such science teaching?
- 6. What knowledge serves a person well irrespective of his profession?

**C.**

- 7. Who can be curious and informed about the nature of matter?
- 9. Can you say that expanding of frontiers in science is characteristic of all sciences?
- 10. Which of the statements is true:
  - a) expanding of frontiers in biology results in an increase of interest of the majority of students in the fundamental processes of life;
  - b) the fundamental problems in biology are of no interest to anybody;
  - c) some students are interested in the fundamental problems and some are not.
- 11. What is similar between the history of science and the history of mankind?
- 12. Do all the kids and students realise this resemblance?
- 13. Give synonyms to "individuals and events are all but invisible".
- 14. Find the controversies expressed in paragraph C and their textual markers.
- 15. Express the main idea of the paragraph in one sentence.

**D.**

16. Complete the following sentence:

In the author's opinion the main causes of the problem described in C. are:

17. What qualities and abilities do a science student and a future scientist possess? They are: a), b), c), d).

18. Does the attitude of school administrators to science test scores coincide with that of the author?

**E.**

19. What problems do science teachers face in their work?

20. Do all the schools follow such an architecture of school system?

**F.**

21. What type of mind is characteristic of young children?

a) ...;

b) ...;

c)...

22. Can the educational process described by the author help in developing these abilities?

**G.—H.**

23. Name the problems teachers face in their work?

24. What is the attitude of the author to textbooks?

25. How does the author characterise science?

26. Explain the meaning of the word "context"

27. What is the modality of paragraph H and what is its purpose? Render the main idea in your own words, preserving the modality.

28. What, in the author's view, should a true teacher do? Find in the paragraph the ways to achieve it.

**I.—J.**

29. Express in one sentence the main idea of I.-J.

30. What in the author's opinion should be in the core of any scientific course?

31. How does the author account for this choice of the "contexts"?

**K.**

33. What requires a large effort by individuals, corporations, and publications?

34. What does the word "one" stand for?

**L.**

36. Give synonymous expression to "science is entertaining".

38. State the main idea of the paragraph.

39. Artificial restraints that arbitrarily measure accomplishment are: a), b), c).

40. What will the liberation of teachers from artificial restraints result in?

41. Divide the text into parts and entitle them. Translate: **B.**, **E.**, **G.**, **K.**, **L.**

## WHERE BRAIN AND ELECTRONICS MEET

*may arise the ultimate thinking  
machine, the brainstorming computer*

**A.** A mouse sniffs around a lab late at night, while an exhausted researcher slumbers over a supercomputer terminal. Although neither can tell us what's going through his mind, both brains are putting out waves, a quietly reverberating electrical storm that present-day computers can't duplicate.

**B.** Unless the scientist is Roger Traub: His computer might be giving off waves, too. To Traub's astonishment, his computer started doing just that last year. Traub devised a program that re-created a 9.900-cell slice of brain circuitry, an anatomically accurate network. When fed simulated sensory input, the brain-slice program responded with a series of artificial theta waves. "It was completely spontaneous", remembers Traub, a neurologist and research fellow at IBM's Thomas J. Watson Research Center in Yorktown Heights, New York.

**C.** For years, computer scientists in the neural network field have striven to design machines that can think like brains. But no one knows how brains do it. Brain-scanning tools only measure the collective voltage of millions of firing neurons. Some neurons send excitatory, others inhibitory messages. Both types are interlaced in a labyrinth of connections and feedback. Traub's program is a big step toward mapping this electrical traffic. It also demonstrates how far

neural network computers must evolve before they can replicate brain functions. 15–20

**D.** In the early Eighties, Traub assembled his first computerised model from experiments aimed at understanding epilepsy. At Columbia University, he and colleagues pieced together a model of excitatory connections between cells based on a statistical analysis of recordings from a slice of rat hippocampus — a hot spot of electrical activity. Ultimately, they built a model of a healthy hippocampus. When Traub delivered a sensory-type signal to one of his simulated neurons the entire network settled into a low-frequency oscillation. A rhythm swept around the network; groups of cells fired in unison, then rested, almost like stadium spectators doing “the wave”.

**E.** From Traub’s models comes a picture of a brain far more dynamic than suggested by current neural network computers. Computers work by channelling electrical activity into precise, insulated currents. Designers toil to avoid having one transistor generate an electrical field that touches off a spontaneous activity in neighbouring transistors. Yet that’s exactly how the brain seems to operate. Also, data processing in computers involves instantaneous electrical events with no aftereffects. “No part of the brain works like that,” Traub says. “There are always aftercurrents that keep a record of past events”. His network incorporates these after-ripples.

**F.** Traub thinks a paradigm of the brain’s functioning may derive from studies of chaos. Physicists, for example, can reduce the turbulence of airflow over a helicopter blade to mathematical values that charted geometrically, settle into a wobbly but repeated orbit. Such a pattern is called a strange attractor. The rhythmic firings of the hippocampus, Traub suggests, may be a similar manifestation of the underlying chaotic firing of individual neurons. 50

**G.** “If you change the initial conditions, set up different connections and strengths of connections”, he notes, “the pattern is disrupted but you still get an oscillation. And that behaviour suggests a strange attractor”. 55

**H.** A strange attractor could represent a memory, Traub speculates, and different initial conditions could lead the network to settle on different memories. “Of course it could mean nothing like that”, he admits. “Maybe if you wire it up this way, the damn thing just oscillates”.

I. Could his research lead to new computer architecture? "When we understand the dynamics of this thing", Traub insists, maybe we can find uses for it, but not before".

*By Gregory T. Pope*

### **Class and home activities**

#### **B.**

1. What is the characteristic feature of a living being brain activity?

2. Describe the waves put out by the living being brain.

3. Find the sentence that is a hypothesis. What makes you think so? Find the marker.

What forms an "anatomically accurate network"?

5. What conditioned an artificial theta wave respond?

#### **C.**

6. Why is it so difficult to design machines that can think like brains?

7. What underlies brains activity and functioning?

8. What does the expression "electrical traffic" stand for?

#### **D.**

9. Did Traub aim at creating his thinking computer from the very beginning of his experiments?

10. Enumerate the stages of the experiment.

#### **E.**

11. What is the advantage of Traub's model?

12. What hampers its work?

13. State the function of "yet".

14. What specific feature of brain work is preserved in Traub's computer?

#### **F.—H.**

Find the sentence that is a hypothesis. State the marker.

15. What, according to Traub, underlies brain functioning?

16. Find in the paragraph explanation of the term "a strange attractor"?

17. What role does Traub assign to "rhythmic firing of the hippocampus"?

18. What type of behaviour does a strange attractor suggest?

a), b), c).

19. Summarise the characteristics of "a strange attractor" and give its full description.

20. What is the main idea of the paragraph?

Find in the text the English equivalents of: повторити (2), вчений (2), відтворювати, події, починати вагатися.

Translate: A., B., E., F., I.

## PROJECT 2061: A CONGRESSIONAL VIEW

**A.** Project 2061, the AAAS project to define an agenda for achieving national scientific literacy, is at once admirable and daunting. It is admirable for its clarity of focus; it is daunting in the magnitude of the endeavour implied for our nation.

**B.** Scientific literacy is as vital as language, historical, or cultural literacy. Those who master science have the potential to wield great power over those who do not. A democratic society may flounder unless all citizens understand the spirit, character, and values of the science that empowers so much of society.

**C.** Furthermore, science and technology are economic and cultural engines for much of the world. Science provides new ideas that expand and enrich our world view. Technology provides new products that ease and improve our daily lives. To live and work effectively in such a world requires a fundamental literacy of that science and technology.

**D.** Numerous reports suggest that we are becoming a nation of science illiterates; thus the notion of achieving national science literacy is a daunting prospect. Such a goal demands a high-quality science education program. Implementation of this solution is complex and will require profound changes in our notions about scientists and the science educational system.

**E.** We must broaden our traditional view of the white male scientist to include minorities and women. This assertion has often been made on grounds of equity and fairness, but there are also pragmatic reasons for this revision. The pool of white males available for

scientific careers is decreasing. To maintain our present population of scientists and engineers, women and minorities must be encouraged to enter technical careers. Thus, our educational system, from kindergarten to graduate school, must encourage participation of these traditionally underrepresented groups.

**F.** We also need to encourage careers in science and technology. Many of our brightest young people no longer find these professions attractive. Other careers offer better economic incentives without the prolonged and rigorous training required by science. Society often views science as socially disruptive rather than constructive, and scientists are often portrayed as isolated and withdrawn from society. These and other factors discourage many young people from pursuing careers in science or engineering.

**G.** Furthermore, in order to maintain a pool of talented scientists and engineers, we must be dedicated to science education throughout the educational system, and we must develop incentives that make science education as rewarding as other scientific careers. To do this, scientists themselves should revise their role in society. Scientists must view educational careers with the same seriousness with which they view research careers. This has become difficult in recent decades, in part because of the massive infusion of federal research funding into our academic institutions. This funding has provided invaluable intellectual and material benefits for us all. However, there have been expensive, nonfinancial costs, for this action has caused many of our academic faculties to devalue teaching and to focus on research and its concomitant rewards.

**H.** A National Science Board study of the impact on undergraduate science education of federal support for academic research concluded "faculty members in those areas to which research money was easily available became less citizens of their academic campuses and more citizens of their disciplinary communities. Their priorities shifted from the task of imparting knowledge to the young to the creation of new knowledge. A revision of the professional value system followed inevitably".

**I.** Research is a demanding vocation. It almost seems improper to ask scientists to invest additional energy in high-quality science education. Nevertheless, because most scientific work is conducted

under the sponsorship of society through the distribution of tax dollars, society must expect to receive that energy.

**J.** This is more than a simple case of "He who pays the piper calls the tune". A democratic government must be responsive to the will of the people, that is, society. If society is to properly express its will about spending funds on science, people need to understand what it is they are being called on to do. This means they must be made literate. If the scientific community fails to help develop a scientifically literate society, then it risks destroying the basis of support necessary to continue its existence.

**K.** The eloquent poem by George W. Wetherill, which closes the Project 2061 Report, illustrates this point. The poem reflects on the history witnessed by comet Halley and the space probes launched to study the comet in 1985. It closes with a vision of the return of comet Halley in 2061 for more extensive explorations. Next time there will be more. They'll even mount your haggard head and ride you into Neptune's night! Yes, we still are bold. To retain the boldness to visit comet Halley on its next return to our solar system, a significant expenditure of federal money must occur — money from taxes. Will our country be willing to support such exploration? The answer will be negative unless society understands why such a project is important.

**L.** To understand the importance of such visionary exploration requires scientific literacy. Politicians cannot provide that literacy. It can be achieved only by scientists working in close cooperation with others in society who share their values. Absent that commitment and involvement, I fear that Wetherill's vision of return visit to explore comet Halley, and all that his verses mean for the prospects of Project 2061, will be only an unfulfilled poetic hope.

*By George E. Brown, Jr.*

### **Class and home activities**

#### **I. The main point of the article is that:**

- a) science provides new ideas that help understand the world;
- b) people should pay more for science education;
- c) scientists should get prepared to visit comet Halley;
- d) our future life depends on how literate we are in science and technology.



**II. The author's opinion about the possibility of the American society becoming scientifically literate is:**

- a) negative;
- b) positive;
- c) neutral (he cannot be sure).

**III. The author's view of the state-of-the-art in science literacy is:**

- a) that it is not altogether so bad;
- b) that it is dramatically bad, past any improvement;
- c) that it can be improved.

**A.—F.**

2. Find the sentence that expresses the main idea of the three paragraphs, and its illustration.

3. What is science literacy compared with?

4. Under what condition will a democratic society prosper (B)?

5. What is the main point of paragraph (C)?

“Engines” in paragraph C means: driving force, stimulating factors, assets.

7. Find the author's comments on the characteristic given by him to the project (“it is at once admirable and daunting”).

8. What is meant by “goal”? (D)

9. What changes in the society will help it become scientifically literate? a), b), c), d).

10. Why should there be more women among scientists? (E)

— The ethical reason is that \_\_\_\_\_

— The pragmatic considerations are \_\_\_\_\_

11. The main point of paragraph F is that:

- a) it is possible to find a good job;
- b) scientist and science are “strangers” in a society;
- c) young people do not want to do science;
- d) the society must interest people in pursuing science careers.

12. Why are careers in science not so popular nowadays? (F)

Because: a), b), c).

**G.—H.**

13. Comment on the functions of “this” in G.

Why is federal research funding a controversial asset of educational institutions? (Find the textual markers of this controversy.) (G)

Because on the one hand \_\_\_\_\_  
and on the other hand \_\_\_\_\_

15. What does the author mean by "citizens" in H?

16. The idea behind the phrase "A revision of the professional value system followed inevitably" is that:

- a) we should revise our system of professional values;
- b) there were the following changes in our system of professional values;
- c) research has been pushed to the forefront and teaching neglected.

### I.—J.

17. How does the author explain the idea of the opening sentence of paragraph I? How would you comment on it?

18. What does the author mean by "that energy"?

19. Find the sentence that interprets the saying in J. Who is "he" and "the piper" in it?

20. Which sentence in B echoes the idea expressed in the last sentence of J?

21. "Its" refers to: scientific community; society; basis; support (J).

22. Give the English equivalent of "суспільство" in J.

### K.—L.

23. What word of the poem indicates that a scientist's work is not an easy one?

Who are meant by "we"?

24. "Such exploration" means ...

25. Find another word for "country", "project" (K).

26. There will be good conditions for science development in a society if/when:

a) \_\_\_\_\_

b) \_\_\_\_\_ (you may continue the list)

27. The main idea of K is that:

- a) space exploration needs a lot of money;
- b) federal money must pay for space research;
- c) space exploration requires bold people;
- d) the society must be scientifically literate to give money to space research.

28. Find the sentence in the text that expresses the main idea of K.
29. "It" refers to: importance; literacy; exploration.
30. How can literacy be achieved?
31. Who are "others" (103): other scientists; people; students?
32. Under what conditions will "that poetic hope" be fulfilled (L)?
33. Where do you see cause-effect relations in L? Are there the markers?
34. Find in the text the English equivalents of: у той час/одночасно, потерпіти крах, рушійна сила, колосальний за розмірами.
35. Translate: **B., C., D., F., G., I., L.**

## A WORLD OF MEGACITIES

**A.** Like "a gigantic Las Vegas", the largest cities in the world attract the "gamblers" of society, the young and the fecund who see in a huge metropolis not overcrowding and poverty, but hope and opportunity. And more and more, the cities of their dreams are no longer New York, London, or Paris, but Jakarta, Dacca, or Karachi.

**B.** By the year 2000, 17 of the 20 largest cities on Earth will be located in the Third World, all will support populations greater than 10 million persons, with Sao Paulo and Mexico City expected to exceed 25 million inhabitants. This is a world far different from the one in 1950, when the largest cities were located in the developed countries, and only New York, London and Shanghai had populations greater than 10 million.

**C.** Not only are the locations of these "megacities" shifting from developed to developing nations, the pace and scale of growth are "beyond anything in human experience", said John Kazarda of the University of North Carolina in Chapel Hill at a AAAS session on the prospects and problems of giant cities. For instance, it took New York City some 150 years to reach a population of 8 million souls. It will take Mexico City only 15 years to add 8 million people to its existing population.

**D.** Yet despite the popular image of the destitute living in shantytowns and rummaging through the garbage dumps for their dinner, there is no consensus that megacities are all bad. Kazarda, for instance, notes that outsiders from wealthy countries are often surprised to learn how optimistic many of the inhabitants of even the

most grim Third World slums are. Destitution is relative. And who comes to the city? Not the dregs of society, but its most highly motivated members, said Janice Perlman of the Megacities Project at New York University.

**E.** In the 1970s, economists observed that productivity increased as cities grew, leading some to speculate that there might not be a limit to city size, and that the extra burdens of such phenomenal growth could be offset by the wealth and productivity of the megacity, said Harry Richardson of the University of Southern California in Los Angeles. But now Richardson believes that "the virtues of big city size were exaggerated".

**F.** Much of the early data on giant cities came from developed countries, particularly the United States. In the Third World, the "negative externalities" of pollution and congestion are more acute, said Richardson. Many megacities cannot provide even the most basic services. Only 11% of Manila has sewage pipes. Only 25% of Jakarta gets its garbage hauled away. The former planning director of Sao Paulo calculated that it would take the equivalent of 30 annual municipal budgets just to make up for the current deficiencies in the city's water, sanitation, and road systems.

**G.** Perhaps more important to the economy of the megalopolis, the costs of housing and infrastructure are greater in the megacities than in smaller cities within the same country, said Richardson. These higher costs eat up the available investment capital.

**H.** But the continued growth of giant cities may be inevitable. "Efforts to limit size have failed", said Perlman. Nor is investment in rural development by agencies such as the World Bank keeping people on the farm.

**I.** Managing these giants will continue to be a daunting task, and perhaps greater than ability of present systems of urban management, said Duane Kissick of the Planning and Development Collaborative in Washington, D. C. There is some thought that the city should simply allocate its resources to dozens of neighbourhood "governments", which could then spend the money on problems deemed most critical, be it sewage, overcrowding, or crime.

**J.** Kissick said one technological fix may involve the use of remote sensing technology to help cities plan, or at least monitor, their growth, since traditional mapping of the urban sprawl may be

impossible. But then again, as a member of the audience asked, can a country afford to buy pretty pictures from space, when it can't afford to provide running water for its citizens?

*By William Booth*

### **Class and home activities**

#### **I. The purpose of the article is:**

- to point out the most urgent problems of megacities;
- to stress that the continual growth of giant cities is inevitable;
- to emphasise the danger of a rural area becoming underpopulated;
- to bring home the fact that a megacity is a burden on a society.

#### **II. Find in the text the words identifying a big city.**

Find the English equivalents of: перенаселеність, швидкість та розмах, смітник, покидьки суспільства, це можна зкомпенсувати за рахунок, вартість житла, задача велетенської складності, найгостріші проблеми, технологічні удосконалення.

#### **A.**

1. Young men come to the megacities of the Third World because:
  - they can play cards well and hope to find company there;
  - they hope to make their fortune;
  - they like large noisy places.
2. "Gambler" here means: cards/roulette player; a daring person ready to take a risk; a criminal.

#### **B.**

3. What are the would-be record population cities mentioned here?
4. How did the world change since 1950? Find the words pointing to comparison/contrast relationships?

#### **C.—D.**

5. Could you mention the exact number of people to live in Mexico City in 15 years?
6. What ideas are being contrasted in C. and D.? Find the markers.
7. Identify the main idea and its illustration in D.
8. Find the expression opposite in meaning to "dregs of society".

### E.—H.

9. The idea of E. is that:

- a megacity has its both bad and good sides;
- the negative sides of a megacity prevail;
- wealth and productivity of a megacity will ensure its further growth.

10. Prove that Richardson is right.

11. Identify the main idea and its illustrative support in F.

12. Give examples of most basic city services.

Find the predicate in “Nor is investment ...”

### I.—J.

13. What are the difficulties of urban management the local authorities in giant cities have to face?

14. How do you answer the closing question? Give your arguments.

15. Translate: **D., F., I., J.**

### “OH, I THOUGHT YOU WERE A MAN”

**A.** The woman who played a major role in the discovery of fission was once required to work in a converted carpenter's shop with a detached entrance, so as not to fluster her male colleagues. When the British physicist Ernest Rutherford met *Lise Meitner* (1878–1968) for the first time, he exclaimed with astonishment: “Oh, I thought you were a man”. Meitner spent the rest of Rutherford's visit playing the role of hostess to Mrs. Rutherford.

**B.** And so it went. At a AAAS session on “the uneasy careers and intimate lives” of great women in science, the biographical sketches combined themes of frustration and genius and farce. For instance, Meitner's first lecture at the University of Berlin was entitled, “Problem of Cosmic Physics”. A newspaper reporter at the time wrote that Meitner spoke on “Problems of Cosmetic Physics”.

**C.** Perhaps it was fitting, then, that three of the five women profiled during the session were physicists, since, as Stephen Brush of the University of Maryland at College Park noted, women make up only 7% of employed physicists and astronomers, the lowest percentage of any of the sciences. Said Brush: “Physics seems especially

repulsive to girls. "Only half as many girls as boys take physics in high school, and only one quarter of all high school physics teachers are women, even though women comprise half of all high school teachers.

**D.** Though common themes run through their stories, the women profiled were all individuals. Meitner was shy and "almost timid", said Sallie Watkins of the University of Southern California. Others were painfully self-effacing. When *Marie Goeppert Mayer* (1906–1972), the winner of the Nobel Prize in physics for her elucidation of the structure of atomic nuclei, was offered a part-time job at Argonne National Laboratory in 1946, she replied: "But I don't know anything about nuclear physics".

**E.** Others were not so retiring. *Dorothy Wrinch* (1894–1976), the mathematician turned biologist who proposed a theory on protein structure, wanted to be "a woman Einstein" and "aspired to both professional and popular acclaim", said Pnina Geraldine Abiram of Harvard University. A vigorous suffragette, Wrinch confronted "men with an air of moral self-righteousness".

**F.** For all their differences, there were many striking similarities in their stories. The women seemed blessed by supportive parents, often a father who encouraged his daughter's interests and talents. Mayer, for example, came from a family of seven generations of professors. "She was said to have been told by her father that she should not grow up to be a woman, meaning a house-wife", said Robert Sash of the Fermi Institute at the University of Chicago.

**G.** The women also had mentors, a crucial ingredient in the rise of most famed scientists. For instance, Wrinch had Bertrand Russell. Meitner had Max Planck. Mayer had Max Born.

**H.** The women, too, faced a world that only grudgingly yielded to the aspirations of female scientists. Finding a paying job was a difficult feat. *Cecilia Payne-Gaposchkin* (1900–1979), the astrophysicist who showed that the atmospheres of stars are composed primarily of hydrogen and helium, found no opportunities for her in England. Indeed, during her undergraduate days at Cambridge University, Rutherford "gave her the distinct impression he wasn't interested in female students", said Peggy Aldrich Kidwell of the Smithsonian Institution. Payne-Gaposchkin went to Radcliffe and Harvard, where she held low-paying jobs until finally becoming one of Harvard's first woman professors in 1956.

**I.** Finally, the women struggled to get the credit they deserved for their work. Though no longer excluded, "women were being systematically and effectively marginalized in the world of education", said Watkins of Meitner, who for reasons that are still being debated, did not share with Otto Hahn the Nobel Prize for the discovery of fission.

**J.** Apparently, these days are not over. Brush notes that every biology textbook mentions that sex is determined in humans by the X and Y chromosomes. But few mention that the observation was made by *Nettie Stevens* (1861–1912) of Bryn Mawr College.

**K.** Women still face difficulties translating their contributions to positions of legitimate scientific authority, said Abir-Am. "Now, the key problem of women is no longer whether they can make great contributions but whether they can acquire the resources to preserve their scientific authority and thus protect their contributions from those to whom authority comes naturally in our culture, i. e. men".

*By William Booth*

### **Class and home activities**

#### **I. The purpose of the article is**

- to show how a woman-scientist has been discriminated against throughout the history of science;
- to give examples of women's contribution to science;
- to emphasise the fact that a man scientist has more authority in the modern world of science than a scientist of the opposite sex.

#### **II. Find the words identifying outstanding scientists in the text.**

**III. Find the English equivalents of:** бути в центрі уваги, не сприймає, половина всіх хлопчиків, самоприпинення, попри відмінності, наставник, високооплачувана (низькооплачувана) робота.

#### **A.—C.**

1. What does the last sentence of A. prove?
2. What does "it" mean in the first sentence of B.?
3. Find the words that characterise the destiny of a great woman in science.

Based on the examples of the text, try to see if it is true.



4. "Physics seems especially repulsive to girls" means that:

- girls dislike physics;
- teachers in physics find girls less capable than boys;
- discrimination in this science is more vivid.

**D.**

5. "To profile" here means: to show one's lovely face; to face somebody with one's profile turned to him; to take a prominent place.

6. Show that you understand what the word "individual" means in the context.

What features may characterise an individual? Which are mentioned in the text?

7. Find the relationships of contrast and comparison.

8. Can we speak of the character traits being more of a man than a woman? If so, what are they, in your view?

**F.—I.**

9. What is the main idea of F.—I.? In which paragraph is it expressed? Indicate its illustrations. Does each of the paragraphs have an idea of its own? Is there an illustration there too?

10. What was Mayer's father against as regards the career of his daughter?

11. Translate the sentence: "She was said ..."

**G.—H.**

12. How does the author describe the role of a mentor in the women's lives? Quote him.

13. The first sentence in H. means that :

- the women blame the world for being so hostile to them
- the women's ambitions are too big for the world to help the women realise them
- there's little chance of the women's dreams in the world of science becoming true.

**I.—K.**

What is the idea that unites I.—K.? Find its illustration.

14. "Credit" in I. means: money, respect, reputation, and appreciation.

15. "Women were being systematically and effectively marginalized in the world of education ..." means that:

- education is another area where women do not share equal rights with men;
- there is always a limit to women's capabilities to learn;
- systematic and effective approach of women to education singles them out in a scientific community.

16. Is the second sentence in I. an illustration of the main idea of the paragraph? If so, in which part of the sentence is it found?

17. What does "these days" in J. mean? Identify the relationship of contrast. Find the marker.

18. How is the main idea of K. spelled out by one of the scientists?

19. How are men scientists described in K.?

20. Translate: **D.**, **F.**, **I.**—**K.**

## SOLAR POWER AND PRIORITIES

**A.** Serious as the problems of acid rain, toxic waste, and depletion of the ozone layer are, the greenhouse effect looms over all of them because it poses such great potential damage to the environment and is by far the most difficult to solve. The consensus prediction for a doubling of the CO<sub>2</sub> concentration, for example, is the year 2050 — extremely close for a solution requiring scientific innovation, political courage, and international cooperation.

**B.** In developed countries the standard of living has been correlated with energy consumption per capita, with a steady rise in consumption occurring in the countries already consuming the most energy. In developing countries the consumption of energy is much lower, but the rate of increase is high. That mixture is explosive because developed countries argue that there is no point in conserving energy if developing countries keep using up the margin, whereas developing countries argue that they deserve to reach the consumption level of their rich peers. One might argue that we should delay action until the data on the current global warming are conclusive were it not for the fact that the energy industry is so massive. Even after a course of action is agreed upon, years will be required to implement it. Damaging environmental effects may be irreversible.

by then. A further argument against delay is that the remedies for the energy problem will help solve other environmental and economic problems.

**C.** The first and most important decision is the inauguration of a massive effort to use solar power. Solar power is not now cost-effective compared to oil. When the temporary energy crisis in 1973 and 1974 was over, the pressure for immediate alternative sources of energy disappeared. The long-range problems were forgotten. To develop solar energy technology to supply large amounts of power (not just for satellites and specialised missions, important as they are) should be a major priority of our civilisation. It will be more and more cost-effective as oil becomes more and more expensive.

**D.** The energy crisis requires both technological fixes, such as solar energy, and societal restraint fixes, such as limit on the sizes and number of automobiles. The list of actions could go on to include major conservation efforts, better urban planning, encouragement of mass transit, tax laws to save our high-rise central cities, and zoning to decrease urban sprawl. If those measures that will take much political courage, are to have a chance, they must be accompanied by some tough dealing on international issues. The developed countries can hardly say to the developing ones that the globe is at its limit of producing greenhouse gases and newcomers must stick to using bicycles. The developing countries, on the other hand, can hardly tell the developed countries that they must subsidise the continuing population explosion. Some international trade-offs can obviously take place: developed countries can concentrate on conservation plans and funding for technological solutions; developing countries can concentrate on solving the overpopulation problem and preserving their forests and greenlands. The Montreal protocol on phasing out chlorofluorocarbons is a good first step in international cooperation.

**E.** Cliches about world peace roll readily off the tongue, but there is perhaps no more dramatic form of aggression of developed countries against developing ones than a gradual global warming. Developed countries are largely in temperate zones and can survive increases in temperature. Many developing nations lie in the tropics, and greenhouse climate changes could make life marginal

and desperate. Fortunately, this is not a case of "them against us", for we are all in this environment together. The problem is one that will require politicians to think beyond the next election and citizens to think beyond the next generation. It will require the combined and dedicated attention of physicists, chemists, biologists, engineers, city planners, economists, efficiency experts, and politicians.

**F.** There is, of course, an alternative. We could pick an appropriate mountain and build on it gigantic space vehicle designed to allow a male and a female of each species to be blasted off to live happily ever after on a distant but more livable planet, such as Venus.

*By Daniel E. Koshland, Jr.*

### **Class and home activities**

#### **A.**

1. What are the contributors to the worsening of the world environmental situation? Which of them is the most serious, and how does the author account for that? Is the problem purely scientific?

#### **B.**

2. How do developed countries differ from developing ones in the question of energy consumption?

3. What does "that mixture" mean?

4. The focal point of the argument between developed and developing countries is that:

a) — developing countries keep consuming energy because they have plenty of it;

— they are sure the high energy consumption level will make them more powerful;

— by consuming a lot they try to ascertain their equal rights with developed countries in this question;

b) — developed countries would like to outdo the developing ones in the consumption;

— they think it not reasonable to save if your partner is a great spender.

5. What are the two arguments against the delay in the problem of energy consumption? What is the counter argument?

**C.—D.**

6. Would you build cause-effect relationships in C.?

7. What is meant by “technological fixes” , “societal restraint fixes” in D.? Give examples of both.

8. How are developing and developed countries described through their potential arguments in the question of energy consumption?

9. “Trade-offs” means: commercial relations, cooperation, compromises.

10. What could possibly be the contribution of both developed and developing countries into the solution of the global problem?

**E.**

11. Give reasons why developing countries are the first to suffer from global warming. Are we all not in the same boat?

**F.**

12. How do you like the alternative?—

13. The alternative is suggested:

— to show that a good way out still exists;

— to prove that science today is plenipotential;

— to say that there really is no alternative.

14. Find the English equivalents of: прогноз, з яким всі згодні; парниковий ефект, набагато складніший для розв'язання; співвідноситися з ; використовувати зекономлене; якби не; небезпечне поєднання; рентабельний; компроміс; поступово відмовлятися від; згадуються сталі висловлювання; найбільш придатний для життя.

15. Translate: **C.**, **D.**, **E.**

**A MORAL FOR ANY AGE**

**A.** On May 12, 1946, Louis Alexander Slotin was carrying out an experiment in the laboratories at Los Alamos with seven other men. Slotin was good with his hands; he liked using his head; he was bright and a little daring — in short, he was like any other man anywhere who is happy in his work. At Los Alamos, Slotin, then aged thirty-five, was concerned with the assembly of pieces of plutonium, each of which alone is too small to be dangerous, and which will only

sustain a chain reaction when they are put together. Atomic bombs are, in fact, detonated in this way, by suddenly bringing together several harmless pieces of plutonium so that they form a larger, explosive mass. Slotin himself had tested the assembly of the first experimental bomb that had been exploded in New Mexico in July 1945.

**B.** Now, nearly a year after, Slotin was again doing an experiment of this kind. He was nudging toward one another, by tiny movements, several pieces of plutonium, in order to ensure that their total mass would be large enough to make a chain reaction; and he was doing it, as experts are tempted to do such things, with a screwdriver. The screwdriver slipped, the pieces of plutonium came a fraction too close together, and suddenly the instruments, which everyone was watching registered a great upsurge of neutrons, which is the sign that a chain reaction has begun. The assembly was filling the room with radioactivity.

**C.** Slotin moved at once; he pulled the pieces of plutonium apart with his bare hands. This was virtually an act of suicide, for it exposed him to the largest dose of radioactivity. Then he calmly asked his seven coworkers to mark their precise positions at the time of the accident, in order that the degree of exposure of each one to the radioactivity could be fixed.

**D.** Having done this and alerted the medical service, Slotin apologised to his companions, and said what turned out to be exactly true: that he thought that he would die and that they would recover. Slotin had saved the lives of the seven men working with him by cutting to a minimum the time during which the assembly of plutonium was giving out neutrons and radioactive rays. He himself died of radiation sickness nine days later.

**E.** The setting for his act, the people involved, and the disaster, are scientific; but this is not the reason why I tell Slotin's story. I tell it to show that morality — shall we call it heroism in this case? — has the same anatomy the world over. There are two things that make up morality. One is the sense that other people matter: the sense of common loyalty, of charity and tenderness, the sense of human love. The other is a clear judgement of what is at stake: a cold knowledge, without a trace of deception, of precisely what will happen to oneself and others if one plays either the hero or the coward. This is the

highest morality: to combine human love with an unflinching scientific judgement.

F. I tell the story of Louis Slotin for another reason also. He was an atomic physicist who made a different choice from mine. He was still working on bombs when he died, a year after World War II ended. I do not think the less of him because he took one view of a scientist's duty and I take another. For the essence of morality is not that we should all act alike. The essence of morality is that each of us should deeply search his own conscience — and should then act steadfastly as it tells him to do.

*Dy Jacob Bronowski*

### **Class and home activities**

#### **A.**

1. How does the author describe a man who is happy in his work?
2. In which case do pieces of plutonium present danger?
3. On what principle is the detonation of an atomic bomb based?
4. What is Slotin's experience in dealing with plutonium?

#### **B.**

5. What kind of an experiment was the scientist engaged in?
6. What was the purpose of the experiment?
7. Was the scientist making the experiment expertly?
8. How were those present following the experiment:
  - by watching only the scientist;
  - by watching the instrument.
9. What signals that a chain reaction begins?
10. What is the result of a great upsurge of neutrons?
11. In the sentence "The screwdriver slipped ...", point to the cause and the result.

#### **C.**

12. What action was termed "an act of suicide"? Why?

What word points to cause-effect relationships in the second sentence of the paragraph?

13. What is one of the parameters mentioned in the paragraph to be considered while fixing the degree of radiation exposure?

**D.**

14. How did the scientist save his colleagues?

**E.—F.**

15. How do you understand the phrase: "Morality has the same anatomy the world over"?

16. Is morality a purely ethical notion?

17. Does science have any role to play in making moral decisions?

18. What are the two reasons why the story has been told?

19. Could there be any judge of a person's moral choice? If not, what matters in the choice?

20. Find the English equivalents of: ступінь опромінення; обстановка, в якій це відбувалося; у всьому світі; бути в небезпеці; без жодного лукавства; тверезий науковий підхід; моє ставлення до нього не змінилося (я не став його менше поважати).

21. Translate: **D.**, **E.**, **F.**

## SCIENTIFIC KNOWLEDGE:

### PROBLEMS OF DISSEMINATION

**A.** Most readers of this article derive their knowledge of science from two sources. On the one hand they may have read some books and attended some lectures with a view to passing examinations. They have also read a number of popular accounts of science such as the present article and visited museums or exhibitions. Very few indeed have read what I should call a serious scientific book, nor do they read any scientific journal consistently. They are a very long way from the source of knowledge. And very often they do not understand how scientific knowledge grows.

**B.** The first stage consists of notes made in the field or laboratory. They may be rough, but it is absolutely essential that they should be clear not only when the worker writes them down but when he or she reads them several years later. These notes may be random observations such as "19/9/60. 14.53 hrs. J.B.S.H. saw three *Catopsitia pyrantle* (a butterfly) flying over plot 12". Or they may be notes made as part of a plan, for example, "11/12/60. Weight of green paddy from 12D, 247.3 tolas". Very often such notes are copied at once into a substantial and well-bound notebook.



**C.** Secondly these notes are tabulated and classified. Perhaps the paddy from 48 plots has been weighed, and in these plots four different varieties of rice had been planted. Of the twelve plots devoted to each variety four were untreated, and two other sets of four treated with different amounts of ammonium sulphate. If so it will be desirable to draw up a table with three rows and four columns. Then it will be easy to see whether for each variety the yield goes up with the amount of ammonium sulphate added, or which is quite likely, the yield falls in some varieties. At this point graphs may help the research worker to see what is happening.

**D.** The third stage is a careful analysis of these results. We find, say, that a particular treatment raised the yield of Randhani Pagal rice by 27 per cent on average. But the effect was not very regular, and it might have occurred by chance with a probability of about seven per cent. It will be well to repeat these experiments over several years before publishing.

**E.** The fourth stage is publication. It is quite common to publish a short preliminary account in a journal such as *Nature*, *Current Science*, or *Science and Culture*, and a more detailed one in a journal which publishes longer articles, such as the *Proceedings of the National Institute of Sciences of India*, or the *Journal of Agricultural Research*. Some scientific results of real value are published in official documents. They are often inaccessible to foreign scientists working in similar fields if only because scientific libraries do not subscribe to them.

**F.** I edit the *Journal of Genetics*, which publishes original research. Some of the papers submitted are quite unsuitable. I recently rejected one of about ten pages simply recording that the authors had failed to get any seed on crossing two plant species. They had not found out where the block occurred. Perhaps the pollen grains of one did not sprout on the other. Perhaps seeds were formed and did not develop. But readers were not told. Other papers are unintelligible. Or perhaps I think I can understand them, but am fairly sure that most readers will not. Other authors insist on saying everything three times over and drawing graphs as well as making tables to describe the same results. When I try to reduce their length they think I am spiteful. In fact people are very unwilling to read long papers unless their content is particularly interesting and an author

who compresses his results is much more likely to get an international reputation than one who covers a lot of paper with them.

**G.** I trust that I have never rejected a paper offered to the *Journal of Genetics* merely because I disbelieve in the author's conclusions. I have rejected some because their conclusions did not seem to follow from the facts presented, a very different matter. But a scientific editor must realise that in rejecting what he thinks is nonsense he may be rejecting work that is too original for him to understand. Just for this reason teachers, students, and above all, journalists, must not believe that because a paper has appeared in a reputable scientific periodical, its conclusions should be taken as generally accepted, let alone true.

**H.** When I was a professor in London I thought that my main jobs as a teacher were two. First I tried to introduce first year students to the subject which I taught. Secondly, I tried to give the advanced students a summary of work too recent to have got into any text-book, I told my boys and girls to read it. But a text-book, is generally five or ten years out of date, and no self-respecting university should base its course on text-books.

**I.** Besides text-books there are several other kinds of scientific books. There are books dealing with a rather restricted field of science, such as my books on enzymes and biochemical genetics. In these books I did not try to summarise all work which had been done in these fields, but all which is thought important. Of course I was often wrong in my judgements. Such books as these are read mainly by professional scientists. A few great monographs, generally written by groups of specialists, may be valuable even after a century. Thus, *The Flora of British India* was published between 1872 and 1897. It is still indispensable, though it requires a great deal of revision. One of the tasks before independent India is to write an up-to-date account of our plants. Most books of this sort become out of date in ten years or so. Students should always look at the date of a scientific book before they read it.

**J.** Many popular books on science are extremely bad, and as they are praised by ignorant reviewers they often achieve wide sales. Others are not without merit. But it is very hard to judge. Finally, science fiction sometimes, but very rarely, achieves the advancement of science.

**K.** The use of a library is a very important part of university education in Europe. Students learn how to find books and use periodicals. If they are merely directed by lecturers to consult a particular page they learn very little. They must be able to go to shelves and look at books.

**L.** It is quite impossible for any one man to choose the books for a library. A committee of a dozen or so specialists is needed and even so mistakes will be made. In a properly constituted college or university the library committee is one of the bodies to which distinguished scholars are appointed, while finance and the like are left to less intellectual persons. The librarian must of course exercise his discretion. The professor of Sanskrit might like a monograph on Tokharian B (ancient Aryan language) or the professor of zoology a French monograph on crustaceans. But the librarian must ask whether anyone else will read them. If not, they should probably be refused. On the other hand, a professor may want books which are likely to help students, but not scholarly enough for his own use. A good library committee can and does arrive at a compromise in such cases. But a librarian should be a man of wide knowledge and strong character.

**M.** I have seen a number of university and college libraries in India. In most of them some sections have seemed to me about as good as could be got with the money available while in others money was clearly being wasted. In America, and to a less extent in Europe, there are microfilm services. If one knows the title of an article, or even a book, one may be able to get a microfilm of it.

*By J. B. S. Haldane*

### **Class and home activities**

**A.**

1. Enumerate the possible sources of deriving knowledge of science.

2. Which of the following sentences is the closest in meaning to the second sentence:

a) all the people interested in passing examination usually read some books and attend lectures;

b) it is allowed to read some books and attend lectures to pass examination;

c) all the people interested in passing examination have perhaps read some books and attended lectures.

3. What does "they" stand for?

4. Can you find any cause-effect relationship in this paragraph.

#### **B.—E.**

5. Stages of what process are described in these paragraphs?

6. State the modality of these paragraphs?

a) recommendation;

b) order;

c) suggestion;

d) request;

e) probability;

f) possibility.

Find the textual markers to prove your point of view.

Paraphrase the sentences and express similar meaning using other lexical or grammatical means.

#### **E.**

7. Complete the sentence:

The difference between such journal as "Nature, Current Science ..." and "Procèedings of the National Institute" and official documents is ...

#### **F.—G.**

9. To be published in the Journal of Genetics the article should be:

a); b); c); d); e)...

10. The main reasons underlying the scientific editors' decision concerning the publication of an article are:

a) objective —

b) subjective —

11. Is there any contradiction between these reasons? Find the textual marker to prove your point of view.

#### **H.—J.**

12. Enumerate the main kinds of scientific literature. State their merits and demerits in teaching students.

**K.—M.**

13. Which of the following statements is true:

a) the use of a library is an important part of university education in Europe because it provides the students with books and periodicals their teacher refers to;

b) the use of a library is an important part of university education in Europe because it teaches students to look for the needed information.

14. Complete the following sentences:

a) when choosing books for a library the specialists should \_\_\_\_\_

b) when choosing books for a library the librarians should \_\_\_\_\_

c) when choosing books for a library the scholars should not \_\_\_\_\_

d) when choosing books for a library the librarians should not \_\_\_\_\_

15. Divide the text into several parts and entitle them.

16. State the main idea of the text.

17. Find the English equivalents of: напевно прочитали; далекі від; дійсно цінні результати; зажити міжнародного визнання; відхилити статтю; у першу чергу; не кажучи вже про; необхідний; сучасний; застарівати; добре розкупувають; визначні вчені; використовувати свій фаховий досвід; недостатній науковий рівень.

18. Translate: E., G., J.—M.

## BIOLOGY AND TOWN-PLANNING

A. The Editor of the "Star" has asked me how, as a biologist, I should plan London. My first impulse was to refuse to write on the subject. For I certainly don't know enough about human biology to answer his question. Nor does anyone else. And sometimes it is worth while telling the world how little we know.

**B.**

If a government asked me to plan the feeding of London's children I should take the job on. For I know where to go for figures as to what food they need, and what it costs. But there is no biological

standard of housing today any more than there was a biological standard of diet fifty years ago.

**C.** We know a few basic facts about the effect of environment on health. Or rather we know what the position was in 1921. Since then our government has published very little on the question, because no one appears to be interested in it. Labour and Liberal men and women find it just as boring as Tories, because what little knowledge we have is based on statistics.

**D.** We know that country life is far healthier than town life, and that poverty is not a serious cause of death in the country, since farm labourers live as long as their employers, except for a slightly greater infantile death rate. We know that in the towns the poor die very much quicker than the rich. And most of the occupations that are healthy for town dwellers, such as driving vehicles, involve a good deal of exposure to fresh air.

**E.** We don't know how much of the high death-rate of the urban poor is due to overcrowding. Certainly not all. Some is due to the fact that most of the people who can't afford a proper house can't afford proper food either.

**F.** And there are more sorts of overcrowding than one. Mr. Smith lives in a nice roomy house at Edgware, but spends an hour a day in grossly overcrowded tube trains. He might be healthier if he lived in a much smaller house in central London, but walked to and from his work. Mr. Jones has a roomy house, and walks to his work, but he goes to a stuffy cinema every evening except when he attends rather crowded political meetings where I and other speakers spray him with germs from our throats. Should we plan to avoid these varieties of overcrowding, and would anyone thank us if we did?

**G.** I pass over the more obvious of planning, such as broad straight roads, zoning of separate residential and factory areas, parking places for motor vehicles, and so on. Even with considerably better roads, and staggering of hours of work, we should still have gross overcrowding of transport if the present tendency to work in the centre of London and to live on its edge continues.

**H.** So my first task would be to try to make central London a place fit to live in, with open spaces for children to play, and as much sunlight as possible for everyone. We can only make room for the present population if we build taller buildings. These buildings

would take the form of large blocks of flats. The individual house in a large town is a luxury. Only millionaires can afford one in central New York, and as millionaires and planning don't go together, no one would be able to afford one in a planned London.

**I.** There would be a minimum standard of crowding, and a maximum, to be gradually approached for all, of a small bedroom with its own shower-bath and lavatory, for each unmarried person over three years old. The number of living-rooms per family would rise from a minimum of two. Cooking would be largely communal, but I see no reason to discourage meals in the home.

**J.** One serious problem arises in the planning of large blocks. If every room is to have an outlook onto a street or garden the buildings would have to be so tall and narrow as to keep most of the sun from the ground level. I do not believe in the need of direct sunlight for bedrooms. And fresh air is somewhat of a fetish. If enough people sleep in one room it must certainly have its windows open if they are not to infect one another. But ventilation with purified and conditioned air is probably as healthy, and certainly cleaner, than ventilation by open windows. So in the interest of light for London as a whole I would be willing to have many bedrooms, but not sitting-rooms, opening on narrow walls, and artificially lit.  
60-65-70

**K.** Every roof would be a garden, and about one block in four would be an open space. Smoky fires and steam locomotives would be forbidden, and buildings faced, so far as possible, in white or bright colours. Even so we should have enough dull and rainy days to make provision for indoor physical recreation necessary. Here I should be inclined to copy the Peckham health centre on a very large scale. This really admirable institution provides swimming and other exercise for its members, and also facilities for a medical examination from time to time even when they are well, and whenever they are ill.

**L.** London would have a thousand of these health centres instead of one, and the emphasis in the medical profession would pass from the cure of disease to the positive encouragement of health. The general public would be far more willing to undergo an annual medical inspection if it were conducted in a building that was also a club house.

**M.** Among the most overcrowded places are public houses. This is partly because there are not enough of them in some parts of London, but mainly because there is nowhere else where a working man can go of an evening to talk. My plan would include a great variety of alternatives. A group of men or women would find it easy to hire anything from a small room to a large hall for any communal purpose, music, chess, politics, drama, or simply conversation.

**N.** Some would serve double purpose. For example, if most of the young married women went to work, as they would in a planned London, we should need plenty of creches in which they could dump their babies during the day. These could be used by workers for recreation in the evening.

**O.** It would be up to planners to break the monotony of a planned city in such ways as this. There would be other planned recreations on a larger scale. I would have at least half a dozen zoos in London and several botanical gardens besides Kew. They would be part of a general scheme to get Londoners to think in terms of life rather than mechanism.

**P.** A very important part of the plan would be experiment. We know something of the effect of hot wet air in the factory on human health from its killing effect in the Lancashire cotton mills. We knew very little about the healthiest temperature in the home. Yet if climate out of doors affects health, so should climate indoors. Different buildings would have their air supply at different temperatures and the effects noted. The health of people living on the north and south sides of a building would be compared. Only so would we get the needed data for a further step in planning.

**Q.** Would this make us a nation of valetudinarians I don't think so. I am not a miser because I look at my bank balance once a month. In a community once a general level of comfort was reached, a non-competitive struggle for health might well supersede the competitive struggle for wealth.

*By J. B. S. Haldane*

- 1) paddy — unmilled rice
- 2) tola — a unit of weight of India
- 3) to sprout — to begin to grow
- 4) spiteful — full of ill-feeling, malicious
- 5) roomy — having plenty of space



- 6) to stagger — here to arrange (things) in such a way that they do not all occur together
- 7) public-house — a licensed saloon or bar
- 8) creche (French) — a day nursery
- 9) valetudinarian — a person in poor health, esp. one preoccupied with the state of his health
- 10) miser — a person who lives miserably in order to accumulate money

### **Class and home activities**

#### **A.—B.**

1. State the main idea of paragraph A.
2. Quote from B. the author's reasons for not writing an article on town-planning.
3. Which of the following sentences express the same idea as in the last sentence of B?
  - a) nowadays there are both biological standards of housing and of diet;
  - b) the situation with biological standards of housing today is the same as with biological standards of diet some time ago;
  - c) there are no biological standards of housing today, but there are standards of diet.

#### **C.**

4. Characterise the attitude of the Government towards the effect of environment on health, and explain the reason for it.

#### **D.—E.**

5. Which of the following statements is true?
  - a) death-rate both in the country and in the town depends upon the standards of living;
  - b) death-rate both in the country and in the town depends on ecology;
  - c) death-rate in the country is different from death rate in the town and depends on different factors.

#### **F.**

6. Find in the paragraphs the possible causes of the high death-rate of the urban citizens.
7. Find in the paragraphs the possible ways to improve the situation. Explain the choice of the means used to express the idea.

### **G.—O.**

8. Enumerate the main changes in town and house planning the author would like to introduce. Find in the paragraphs the reasons for introducing them, the ways to make them, the difficulties, if any, which might be encountered on this way. Copy them out in four columns: change to be made | reason | the way to make it | difficulties

Express your attitude to it.

9. State the modality of the foregoing paragraphs.

### **P.**

10. Explain the use of “yet”. What type of relationship is expressed in the paragraph?

### **Q.**

11. What does “this” stand for?

12. Find in the paragraph the necessary prerequisite for the struggle for health.

13. State the modality of the paragraph. Express the same idea by different means.

14. What is the main difference in struggle for health and for wealth, and why?

15. State the main idea of the text.

16. Find in the text the clues that could help you to make an inference about the time of writing the article. Does the author deal with the present-day situation? Use the strategy of inference.

17. Find the English equivalents of: просторий будинок; початок робочого дня в різний час; виходити вікнами на (2); я не є прибічником; фасад будинків пофарбовано; пропаганда здорового способу життя; проходити медичний огляд; вечорами; перевершити.

18. Translate: A., H., I., K.—Q.


# СКЛАДАННЯ АНОТАЦІЇ (РЕЗЮМЕ) НАУКОВОЇ СТАТТІ

## HOW TO WRITE AN ABSTRACT TO AN ARTICLE

The abstract provides the reader with a brief review of your study based on the information from your report. Many readers depend on the abstract to give them enough information about the study to decide if they will read the entire report or not.

The box that follows shows the typical information format of an abstract.

- B — some background information
- P — the principle activity/purpose of the study and its scope
- M — some information about the methodology used in the study
- R — the most important results obtained in the study
- C — a statement or recommendation

 *It is advisable to be fairly modest when writing about the importance of the results obtained. Use tentative words and expressions given below.*

**Some background information (B).** Present a contextual setting and say about the previous work of other researchers: 1) You may indicate that the previous literature described earlier is inadequate because an important aspect of the research area has been ignored by other authors. 2) You may indicate that there is an unresolved conflict among the authors of the previous studies concerning the research topic. This may be theoretical or methodological disagreement. 3) You may indicate that the examination of the previous literature suggests an extension of the topic, or raises a new research question not previously considered by other workers in your field.

### THE TYPICAL INFORMATION AND LANGUAGE FORMAT OF THIS SECTION

Several researchers have studied A,	however, but, unfortunately	few studies have reported on	characteristics, peculiarities, possibilities, etc.
The phenomenon of A has been studied by a number of researchers		there is little information available on	the effect of A on B, the similarity between, side-effects of, etc.
A has been in the focus of attention of late (with many authors),		it is still unclear/it still remains a contradicting point	why/how/when/what/under what conditions/,etc
Much research has been devoted to Z.		the estimate of X is left out of consideration.	

**Lexical markers to use:** although, though, while (хоча, в той час як, незважаючи на, попри), but, however, nevertheless, unfortunately (на жаль).

You begin the sentence with the marker:

E. g. *Although* much research has been devoted to Y, little is known about Z.

*While* new facts have been found about T, little information is available on W.

*Though* it has been shown that..., there exists a problem of J.

*In spite of the fact* that A has been investigated in detail for... conditions; X has not been taken into account/special (particular) attention should be given to R/particular emphasis should be placed on (made of) G.

### ON YOUR OWN NOW

**Translate the sentences using the B-format.**

1. Останнім часом велика увага приділяється У, проте, Р ще недостатньо досліджені.

2. Дослідженню Р надано значне місце в літературі. Нажаль, автори залишають без уваги Д.

3. Питанню про Ш присвячено багато робіт, але А досліджується в цьому зв'язку вперше.

4. Незважаючи на глибоке дослідження, проведене з М, К не знайшло свого місця в цих роботах.

5. Багато дослідників звертали увагу на поведінку Ц у цих умовах. Тим не менш, його поведінку в інших умовах ще не описано.

6. Незважаючи на велику кількість робіт з В, автори обійшли увагою такі окремі його прояви, як П і Л.

7. Хоча вже багато відомо про С, його характеристики при Б ще не описано.

### **The principle activity/ purpose (P).**

1. Here you may state the purpose of the article, formulate the problem (verb –present, future).

*E. g. The purpose/aim/objective of this article/of the present paper/of this report is to determine whether..*

*This paper describes/presents the results of W to determine R.*

*The article will deal with/will discuss the implementation of Q.*

(**Verbs to use:** investigate, study, discuss, describe, consider, outline, formulate, calculate, estimate, evaluate, analyse, examine, establish, deal with, touch on/upon, approach, comment on, develop, design, construct, solve, perform)

2. You may also state the research orientation. You should use the *past tense* of the main verb because the research activity has already been completed.

*E. g. The purpose of this study was to investigate G.*

(**Verbs to use:** to obtain, find out, discover, establish, assess, demonstrate, show, test, check, verify, prove)

1. The subject matter of your study may be presented (verb – present passive)

*E. g. A new characteristic of Z with reference to J is given in this article.*

*A detailed analysis of H has been presented.*

*Functions of K are analysed in detail.*

*A new M has been considered.*

*Considered in the paper is the structure of B.*

*Investigated here are the functions of Y.*

*Presented in the study are the characteristics of D.*

**(Nouns to use:** activity, function, nature, structure, effect, cause, influence, property, analysis, study, classification, description, characteristic, investigation, measurement);

**Attributes:** detailed, thorough, careful, accurate, comprehensive, brief, short, preliminary, extensive, in (great) detail;

**Word-combinations:** to carry out the analysis, to perform/make a study, to give a description, to make measurements, to carry out an investigation, to do research).

*E. g. Attention is paid in the study to the functions of G.*

*An attempt is made here to analyse the nature of K.*

*Use is made in the article of R.*

**(Expressions to use:** to pay attention to smth., to make attempt to do smth. / to make effort to do smth., to place emphasis on smth., make emphasis of smth., to take account of smth., to take advantage of smth., to make allowance for smth., to give consideration to smth., to make mention of smth., to make reference to smth., to make use of smth).

## ON YOUR OWN NOW

**Translate the sentences using the P-format.**

1. У роботі досліджуються деякі функції Л. 2. Автор аналізує властивості В. 3. Вивчаються впливи Н на Д. 4. Описано умови Б. 5. У статті аналізуються деякі фактори Д. 6. Розроблено модель роботи П. 7. Знайдено новий підхід до проблеми А. 8. У статті розглядаються взаємовідносини Є і Т. 9. Досконально описано та проаналізовано механізм У. 10. Отримано попередні дані про Ш. 11. Надано оцінку новим явищам, пов'язаним з Л. 12. У цій статті детально обговорюються сучасні методики у галузі Р. 13. Дається короткий огляд Т. 14. Автор пропонує новий метод отримання Ф. 15. У статті підкреслюється роль А при Д.

**Methodology (M).** The method section is useful to readers who want to know how the methodology of your study may have influenced your results, or who are interested in replicating or extending

your study. Mention the procedural steps used in the study (design of the experiment, population/sample, location, restriction/ limiting conditions, materials, statistical treatment). Use the main verb in *the past* tense, passive structures instead of *which*-clauses and keep old information at the beginning of the sentences.

**Nouns:** method (метод, спосіб), technique (метод, спосіб, методика, спосіб/техніка проведення експерименту), approach (метод, підхід до розгляду, розгляд з певної точки зору), way (підхід, розгляд тощо); problem, question, issue, analysis, theory, effect,

**Adjectives:** improved, modified (удосконалений, видозмінений), another, different (інший), alternative (протилежний, альтернативний), adequate (придатний, що відповідає вимогам, що пасує, адекватний), promising (перспективний), valid (що можна застосувати у цьому випадку, що має силу, справедливий, обґрунтований), rigorous (строгий, чіткий), efficient (економічний), effective (ефективний, дієвий, результативний), accurate, exact (чіткий/точний), crude (нечіткий, грубий), direct, straightforward (прямий), indirect (непрямий), appropriate (такий, що підходить, що відповідає), reliable (надійний), satisfactory (задовільний, добрий), valuable (цінний), up-to-date, current, modern (сучасний), out-of-date (застарілий, що вийшов з ужитку), conventional, usual (звичайний, загальноновживаний), additional (додатковий, допоміжний), general (загальний), principal, basic, main, chief (основний, головний).

**Verbs:** examine (the effect of R on G, the behaviour, the phenomenon, the properties); estimate (the effect of B on A, possible sources of error, the value), determine (the rate, the coefficients, the magnitude, the constants), establish (the fact of, the difference in, the existence of, the presence of); eliminate (distortions resulting from, undesirable effects, disturbing effects due to, the problem, the error due to).

### **Sentence structures:**

*E. g. Studies were made of Z by K using...*

*B was investigated by H/Ving (applying, introducing, changing, etc.)*

*R was analysed under U by means of L.*

*T was solved using F.*

*A modified version of X was used in a detailed investigation of G.*

*A pulse method was used in the study of W.*

## ON YOUR OWN NOW

Translate the sentences filling in the gaps with your information.

1. Розроблено нову методику, призначену для ... Ця методика може бути використана у ... Особливо підкреслюється її ефективність при ...

2. Було запропоновано новий метод аналізу, який ... Цей підхід допомагає визначати ...

3. Нами було застосовано техніку ..., яка дозволяє ...

4. Проблему В було вирішено за допомогою ...

5. При розрахунках Є та оцінці Р використовувались ...

6. Метод Є було застосовано у нових умовах для встановлення відповідності ...

7. Для вирішення проблеми Д використовувався метод П, який ...

**Results (R).** Present the findings of your study and briefly comment on them: explain possible reasons for the results, compare the results with those from other studies (verb — the present tense).

**Verbs of variation:** to increase/decrease, decline, rise/fall, drop, remain constant;

**Verbs of correlation:** to be correlated with, to be associated with; to be highly/significantly/closely related to

**Tentative verbs:** to appear, to seem, prove, to be likely.

**Conclusions (C).** Make recommendations, implications or suggest application and indicate your position toward the information elements included (use simple present, modals or tentative verbs and expressions).

**Sentence closings:** we suggest, the results suggest that, it is found/concluded/recommended/supposed/suggested/anticipated/expected that, thus, we can make a conclusion that, from the results we can make a conclusion that, from the results it follows that, as a consequence a conclusion is made that.

**Verbs:** obtain, give, present, provide, report, check, test, verify, treat, collect, summarise, sum up, find, extend to;

**Nouns:** result on/of, findings of, data on/concerning/as to, evidence for/of/on, fact of/concerning/that;



**Adjectives:** simple, complicated, exact, accurate, excellent, good, satisfactory, final, important, contradictory, convincing;

**Constructions:** there is an agreement (correlation, disagreement) between, the results are in agreement/disagreement with, good agreement is found between, the results do not fit into, the results do not agree with, a good match between...has been obtained;

**Tentativeness:** *modals* — would, might, may, could; *verbs* — suggest, expect, suppose, think, imply.

## ON YOUR OWN NOW

Translate the sentences using the hints suggested above.

1. Робиться загальний висновок стосовно...
2. Було зроблено висновок про те, що ...
3. В результаті вивчення У було зроблено наступні практичні висновки.
4. На основі проведеного аналізу ми дійшли висновку про те, що ...
5. Таким чином, вплив Ф на Д має ... природу.
6. Із результатів робиться висновок, що Є виникає внаслідок ...
7. Отримані дані дозволяють зробити наступний висновок стосовно ...
8. Результати показують, що для ... необхідні подальші дослідження.
9. Пропонується продовжувати розпочатий аналіз.
10. Наш дослід говорить про те, що слід змінити запропонований раніше підхід.
11. Ми пропонуємо застосовувати такі матеріали при ...
12. Факти свідчать про те, що ця методика дозволяє ...
13. На думку авторів, отримані результати можуть прояснити ...
14. Показано, що Р може застосовуватися не лише у ..., але й у ...
15. Можна зробити висновок, на основі проведених випробувань, що Х буде показувати ... при ...

**NOTE** Abstracts are usually written to be as brief and concise as possible. For journal articles the editor often establishes a word limit for the abstract that authors cannot exceed. In order to shorten your abstract you can eliminate or combine much of the information given in the full-format abstract shown above. The emphasis in such **reduced abstracts** is placed on the results of the study. Information concerning the purpose and method is presented first (background information is not included). Then the important results are summarized. Finally conclusions and recommendations may be included in one or two sentences.

### **Format of a reduced abstract**

P + M — purpose and method of the study

R — results

C — conclusions and recommendations (optional)

### **NOW TRY THIS**

1. Read the following abstracts and identify their formats (structural elements: B, P, M, R, C or P+M, R, C).

a)

1. Family background continues to be closely related to individuals' educational attainment in the United States. A notable change in one aspect of this notable background, number of siblings, is occurring as fertility is becoming extremely low. Examination of the negative relation between individuals' sibling number and years of schooling indicates that education among those with many siblings is disproportionately cut short before high school graduation. Because there is a strong negative relation between the number of siblings and scores on tests measuring verbal ability, recent reductions in sibling number would be expected to contribute to enhanced verbal ability and increasing years of schooling for those born now in the United States.

2. A prominent feature of diabetes mellitus is the inability of insulin to appropriately increase transport of glucose to the target tissue. The contribution of different glucose transport proteins to insulin resistance in rats with streptozonocin-induced diabetes was

evaluated. A glucose transporter messenger RNA and its cognate protein that are exclusively expressed in muscle and adipose tissue were specifically depleted in diabetic animals, and these effects were reversed after insulin therapy; a different glucose transporter and its messenger RNA that exhibit a less restricted tissue distribution were not specifically modulated in this way. Depletion of the muscle- and adipose-specific glucose transporter species correlates with and may account for the major portion of cellular insulin resistance in diabetes in these animals.

3. A typology was established for more than 5000 ceramic artifacts at Dolni Vestonici, Czechoslovakia. Conjectured methods of manufacture were confirmed by radiography. The composition and mineralogy of the artifacts were identical to those of the local soil, loess. A firing temperature range of 500 to 800 C was measured and compared with those of hearths and kilns. The mechanism of sintering and impurity-dash initiated, liquid-phase sintering. Many fracture sections show evidence of thermal shock, although thermal expansion of the loess is low. The making, firing and some times exploding of the figurines may have been the prime function of the ceramics at this site rather than being manufactured as permanent, portable objects.

4. Although most animals reproduce sexually, a number of all-female groups exist. Triploid hybrid salamanders appear to maintain themselves by using male's sperm to activate their eggs, after which the sperm nucleus is eliminated (gynogenesis). The incidents of sperm nuclear in cooperation in eggs of these salamanders depends on temperature. Triploid offspring derive gynogenetically are more frequent at lower temperature, whereas tetraploid offspring derived sexually are far more frequent at higher temperatures. Temperature-dependent variability in sperm nuclear incorporation helps explain the variability in reproductive modes reported for hybrid salamanders.

5. Due to their ready availability, database management systems are being applied to bibliographic databases with increasing frequency. This is being done in spite of the fact that although DBMS query languages tend to be very powerful, they are far too complex for the casual user. It is proposed that PSI, an existing-virtual system intermediary for document retrieval systems, be

extended to include access to DBMS containing bibliographic data in order to circumvent the complexity problem for the casual user. PSI currently provides a common command language for access to multiple command document retrieval systems. It is shown that PSI could be extended to provide this same command language to access DBMS, whether the DBMS are relational or network.

6. This paper deals with the use of the critical path method (CPM) and CRIT, a computerized CPM program, as a tool for reporting and development management information systems for hospital decision making. A CPN analysis was applied at the Microbiology Department of Deaconess Hospital to coordinate and synchronize the various tasks for efficient management. Its numerous benefits are cited. The CPM model can facilitate planning, decision making and managerial control by providing management information.

7. This study examined the relative strengths of faculty expertise in the field of data processing within schools of library and information science in North America. The relative strengths of Canadian versus U. S. schools, measured by reported faculty expertise, were the particular focus of the study. Data were gathered from the directory issues of the Journal of Education for Librarianship for the years 1972-1981. Data were aggregated in to two groups: (1) total faculty strength dichotomized by U. S. and Canadian schools; (2) faculty reporting expertise in data processing or automation broken down by U. S. versus Canadian. Planned comparisons using Dunn procedure were made on each of the ten years in the study. The results of testing indicated there is a significant difference in the number of faculty reporting expertise in data processing in the two countries in four of the ten years. The differences were opposites in "two of these four, however. Results of testing of overall faculty strength indicated there was no significant difference in the number of faculty members during the ten-year period. The major conclusion of the study was that Canadian schools of library and information science have made a concerted and successful effort to increase their overall level of expertise in data processing, but without significantly adding to their faculty levels.

**б)**

1. Механізми порушень у клітинах при хронічній дії іонізуючого випромінювання низької потужності у зв'язку з аварією на ЧАЕС.

На основі розгляду результатів власних досліджень представлено концепцію патогенетичних порушень в організмі під впливом постійної довготривалої дії малих доз іонізуючого випромінювання. У тварин, що перебувають у 30-кілометровій зоні ЧАЕС, виявлено значні зміни у вмісті та активності молекулярних переносників електронів в енергетичних системах клітинних мембран. Уперше отримано дані про порушення координації у функціонуванні антиоксидантних ферментів. При використанні розробленого нами методу та техніки низькотемпературної стабілізації встановлено утворення комплексів білків.

Профілактичні заходи, що застосовуються для людей, які проживають в екологічно небезпечних зонах аварії на ЧАЕС для підвищення порогу опірності до розвитку раку та ресурсу толерантності до передчасного старіння організму, базуються на концепції про провідну роль реактивних форм кисню, які взаємодіють з ДНК.

2. Договірне медичне страхування як альтернативна система медичної допомоги населенню.

У статті подається коротка характеристика стану існуючої державної системи медичної допомоги, висвітлені проблеми та причини недостатньої ефективності її функціонування, доводиться необхідність реформування з використанням принципів та механізмів ринкової економіки і сучасного менеджменту.

Обґрунтовуються та концептуально описуються організаційні принципи суспільної моделі договірного медичного страхування як альтернативної системи медичної допомоги.

Показано значимість залучення громадських організацій та структур до процесів реформування системи медичної допомоги.

3. Деякі проблеми практичної підготовки спеціалістів.

Автори вважають, що стан практичної підготовки спеціалістів має велику кількість недоліків, причиною яких є невдале планування навчального процесу на всіх етапах та рівнях. Відмічено наявні недоліки в організації навчального процесу:

відсутність у більшості випадків чіткої схеми та послідовності у викладанні окремих дисциплін, часта невідповідність навчальних програм і недостатня кількість навчальних годин, існуючі складності, пов'язані з працевлаштуванням, ставлення до роботи ряду викладачів та студентів. Викладено рекомендації щодо їх усунення, що включають підвищення якості програм, вирішення проблеми оснащення кафедр необхідними навчальними матеріалами та модулями. Підкреслено, що сучасний етап реформування вищої освіти потребує нового інформаційного ті методичного забезпечення яке відповідає сучасному рівню розвитку науки та технологій. Запропоновано оригінальну методику рейтингової оцінки, що включає три етапи: поточний, підсумковий та екзаменаційний. Крім оцінки знань, методика враховує якість самопідготовки до занять, професійної та загальної культури поведінки студента, ставлення до навчання та зовнішній вигляд.

4. Туризм вважається однією з пріоритетних галузей економіки ХХІ століття. У статті розглядаються питання розвитку туризму в нашій країні. Цій темі було присвячено багато статей та дискусій, проте суттєві зміни так і не відбулися. Аналізуючи публікації присвячені туризму у різних країнах за останні кілька років, автор вказує на невідповідність цін та рівня обслуговування міжнародним стандартам і приходить до висновку про те, що в усьому світі вже використовуються абсолютно нові технології. Особливої уваги автор надає вдосконаленню законодавчої бази та її взаємодії з податковою політикою, вказує на проблеми, що існують у готельному господарстві та в області підготовки кадрів, на необхідність уважного вивчення статистичної інформації, участі у міжнародних семінарах і конференціях. Україні рекомендовано, перш за все, звертати увагу на досвід Польщі, Словаччини, Болгарії та Росії і тісно співпрацювати з СОТ, яка визначає потреби в інвестиціях, підбирає консультуючих спеціалістів, проводить навчальні семінари, розробляє методики та впроваджує різноманітні проекти, скеровані на розвиток туризму.

6. Дискусія з питання фінансування заходів, спрямованих на боротьбу зі СНІДом, полягає у наступному: фактично 90% коштів, що надаються урядом США європейським організаціям,

різноманітним фондам на наукові дослідження, лікування хворих і профілактику СНІДу, витрачається економічно розвинутими країнами, у той час як 90% інфікованих людей живе у країнах з відсталою економікою. В українській пресі ця проблема практично не обговорюється, а її соціальні аспекти взагалі не згадуються. Автор статті виділяє наступні проблеми: юридично не встановлено відповідальність за свідоме зараження СНІДом, діагностика захворювання знаходиться на низькому рівні, бідність системи охорони здоров'я, низький рівень інформованості населення та низька кваліфікація медичних працівників. Міжнародні дослідження показали, що інтенсивне лікування може покращити стан здоров'я ВІЛ інфікованого та подовжити його життя. Однак наразі це лікування є важкодоступним та дорогим. Автори статті вказують на необхідність проведення соціальної профілактики. Ці заходи повинні включати просвітницькі програми для представників груп ризику та широких верств населення. Їх основною задачею є переконання людей у необхідності використання засобів захисту. Значну роль у цьому процесі можуть відіграти реклама та маркетинг. Автори не рекомендують проводити примусове виявлення ВІЛ інфікованих, оскільки це може негативно відбитися на довірі населення.

## **TEXTS FOR TRANSLATION, SUMMARIZING AND DISCUSSION**

### **STRUCTURAL ELEMENTS TO SUMMARIZE THE TEXT**

#### **PURPOSE**

*The chief (central, key, ultimate, main, primary) purpose (goal, aim, objective, task) of the author is + V inf/Ving*

*The present paper goes into (focuses on, deals with, considers, is devoted) to + Ving; undertakes + Vinf) ...*

*In this (present) paper, the author raises the question of (addresses the issue of, closely analyses the problem of)...*

*The author aims (is intended, wishes, wants) to determine (to highlight, to examine, to clarify) ...*

*He has two goals in mind writing this article. The author's concern here is with ...*

### **STARTING POINTS**

*We shall start with (continue, end, finish, close) + Ving./N*

*To begin with, ...*

*First, ... . Second, ... .*

*After these preliminary remarks (this short comment, outlining Z) the author /I will consider (address, introduce, turn to) ...*

*Before we go into this problem, some clarification is needed.*

### **PROGRESS**

*In the rest of the paper (in the remainder of the paragraph, in the course of the analysis) the author raises the issue of (confronts, faces, reflects on) the problem of...*

*The author passes on (moves on) to consider (to give an overview of) the problem of ...*

### **REFERENCE**

*According to F; Following N.*

*We can follow G in assuming that...*

*This argument will conflict with Y (support H, contradict K).*

*This is where D's central proposal becomes relevant.*

*I'll quote T to show that...*

*Z can be cited (consulted) here.*

### **CRITICISM**

*This skepticism stems from popular misconceptions.*

*The approach continues to be misrepresented in current literature.*

*This wrong realization is gaining ground (has got wide currency) due to ...*

*This leaves many questions open. The view has been criticized at length.*

*It does not allow to answer the question whether ...*

*It is unfortunate (erroneous, vague, of a doubtful kind); it rests on dubious claims: it is awkward in two ways; fails to prove (to demonstrate, to show, to clarify) F; it must be judged as false (as a failure); it should be rejected as wrong.*

*It is misleading (strange, uncommon) to suggest that...*

### **REASONING**

*It is reasonable to assume that ...; It is safe to predict ...; It is natural to say that ... ;*



*It might be suitable (helpful, useful, wise, sensible, rational) to mention that...*

*It is interesting to point out (to stress, to emphasize, to underscore, to underline) that...*

### **CONCLUSION**

*To conclude, ...; To sum up, ...; Finally, ...; In closing, ...;*

*Small wonder (no wonder) that ... Not surprisingly, ... It is no accident that ...*

*We conclude this with a few observations (remarks, comments, notes) on Y.*

*The author ends (completes) the paper by demonstrating, repeating, stressing, noting, emphasizing) that...*

### **DOUBTS, FEARS AND HOPES**

As a result of the stupendous achievements of modern science and technology, instruments of communication have become so sophisticated that no part of the world is today isolated; our planet is thus neither more nor less than a "global village".

However, this great human victory is a two-edged sword. Used constructively, it serves to transmit knowledge, fight illiteracy, encourage respect for human rights, consolidate national unity, foster international understanding, and promote economic and socio-cultural development.

But it can also be used, along quite different lines, to subjugate man, to incite to war and racism, to restrict the liberty of sovereignty of peoples, to encourage cultural alienation, to propagate "disinformation".

A growing number of Third World countries. Are interested in the immense possibilities opened up by the technological explosion in communication. Whoever disposes of technology, disposes of communication and thus, also, of power.

However, a small number of industrialized countries and transnational corporations posses a virtual monopoly of these high technologies (electronics, informatics, telematics, satellites, etc.). It is actually in this field that the gap between developed and developing countries is widening the most seriously, and may have the most grievous consequences.

The first of these consequences concerns the technological dependence, which is exemplified notably by the "structural grip" of the North, and the transnationals' control over research and development, the sale of patents and licenses, the delivery of equipment and software, the provision of spare parts and maintenance services, or the operation of artificial satellites.

The second has to do with "absorption capacity". The speed of technical progress very often exceeds the capacity of developing countries to absorb and master such highly specialized technology, which can only be of benefit to them if a minimum of conditions favourable to its assimilation already exist (specialists, qualified personnel, training and research centres). Unfortunately, certain technological choices are imposed by the transnational corporations with reference to their own interests (profits, marketing strategy, dumping) and not the real needs and local conditions of the receiving countries.

Another major consequence is that the tensions between modernity and tradition usually reveal themselves in the downgrading, the marginalization and even the disappearance of certain traditional modes of interpersonal communication; this unequal impact may even lead to ethnocide. Almost invariably the result is an impoverishment of the cultural heritage of humanity and an increase in the feeling of isolation on the part of individuals with, on the one hand, a majority of "receivers" forced into a passive role of listeners, and on the other, an active minority of "transmitters".

*By Jean Ping*

## **SUPPLY AND DEMAND**

Everybody knows, whether or not he has taken a course in economics, that prices in the market reflect "supply and demand". When the price of milk goes up, we all say that the demand for milk must have risen for some reason or other, or that the supply of milk must have been cut. But this very general appreciation of the "forces" at work only begins to explain how prices are actually determined, and tells us nothing about how these prices in turn affect our own behaviour.

What is the meaning of supply and demand? Our acquaintance with rise of market society tells us a good deal about the kind of behaviour the terms describe. We remember that the emergence of the market system forced individuals to shift for themselves in a harsh world where private transactions determined both their income and their expenses. In such a world, sheer self-preservation dictated that buyers and sellers had to follow the arrow of price advantage if they were to survive, much less prosper. Hence buying as cheaply as possible and selling as dearly as possible became the cardinal rule of behaviour for both individuals and firms in a market setting. Added to this was the growing acceptance of economic gain as a primary goal of economic life, and the rule of Buy Cheap and Sell Dear was given a second social sanction.

These historic motives of self-preservation and economic gain have changed considerably as the extreme pressures of early capitalism have given way to the far more sheltered setting of contemporary capitalism. Yet, albeit in the pursuit of somewhat altered objectives, we still usually behave as buyers by trying to spend as little as possible for the goods we want, and as sellers by trying to get as much as we can for the goods and services we have to offer.

This clearly makes *the prices for goods* very important as stimuli that guide our behaviour. Comparative prices enable us to make choices that will improve our economic position. But prices do more than this. *Prices also become signals that direct our behaviour.* In fact, it is through our reaction to prices that self-interest becomes a "force" on the market place.

But since buyers and sellers have conflicting self-interests, how can this be? The answer is that the same price signal gives rise to *different* behaviour, depending on which side of the market we are. A rising price will usually look bad for the buyers but good for sellers. Falling prices will generally be in the self-interest of buyers (who can now satisfy their wants for less money), but against the self-interest of sellers (who will now get less return for their efforts). Thus we begin to see that the price mechanism may be the way of satisfying diverging interests, of bringing together parties whose economic gains lie in opposing directions. That is why microeconomics is sometimes called *price theory*.

*By Mervyn King*

## IMMIGRATION: GLOOM REALITY

As recently as 30 years ago, Europe and the United States, Canada and Australia courted immigration. Cheap, unskilled labour was needed to fuel long postwar economic boom. Turks and Algerians in Germany and France were called "guest workers", and there was no irony in the phrase. But that mood has completely changed. A series of economy slowing "oil shocks" has cut demand for unskilled labour in the rich countries. The 1980's saw the rise of xenophobia from Texas to Bavaria. Immigrants who were once welcomed as contributors to prosperity are now seen as competitors for scarce jobs. Since 1973, all Western European countries have, theoretically banned new immigration. But the ranks of foreigners go on growing, fed by clandestine entrants, legitimate and "fake" refugees and the families of immigrants already existed in a new country.

The new hordes of migrants from the East will add to existing pressures and pose severe problems of conscience for the West. Ever since the start of the cold war, the democratic countries have clarified the "human right" of free movement of peoples. Now history has taken the West at its word. The new immigrants from ex-communist countries expect acceptance in the West as a right. Governments in the industrialized countries want to maintain open doors to "true refugees", those whose life and welfare are at risk back home. But they know they will never be able to absorb the potential millions of Russians and Eastern Europeans who might want to migrate simply to improve their economic circumstances.

Every "receiving country" is desperately seeking for ways to stem the flood, or at least direct it. Individual governments and European Community are trying both to integrate foreigners who have already settled in the West and to impose strict controls on new comers. In the end, though, the attraction of an imagined easy life in the West and the availability of cheap transportation overwhelm every effort at control. A cycle emerges in which the host country stiff-arms all immigrants for several years, then "legitimizes" everybody who has already made it in.

Ultimately, all the experts agree, the only way to stifle migration is to make life in the "sending" country sufficiently attractive to blunt the desire to move. But "ultimately" is a very long time. Living stan-

dards in most of Black African countries continue to fall. The huge Mexican population continues to see salvation on the other side of the Rio Grande. Russians and Eastern Europeans can look forward to at least a generation of poverty and dislocation. So the tides will continue to flow. The rich West will have to find the place for the strangers in its midst. In the end, migration can be productive.

*By Will Rogal*

## **SWISS BANKING SECRECY**

Since the early 1930's, Swiss banks have been prided themselves on their system on banking secrecy and numbered accounts. Over the years, they had successfully withstood every challenge to this system by their own government who, in turn, had been frequently urged by other governments to reveal information about financial affairs of certain account holders. The result of that policy of secrecy was that a kind of mystique had grown up around Swiss banking. There was a widely held belief that Switzerland was irresistible to wealthy foreigners, mainly because of its numbered accounts and bankers' resistance to ask awkward questions of depositors. Contributing to the mystique was the view, carefully propagated by the banks themselves, that if this secrecy was ever given up, foreigners would fall over themselves in the rush to withdraw money, and the Swiss banking system would virtually collapse overnight.

To many, therefore, it came like a bolt out of the blue, when, in the summer of 1977, the Swiss banks announced they had signed a five-year pact with the Swiss National Bank (the Geneva Bank). The aim of this agreement was to prevent the improper use of the country's bank secrecy law, and its effect was to curb severely the system of secrecy. A headline in a British newspaper at that time amply summed up the general view: *Numbered accounts' days are numbered.*

The new code which the banks had agreed to observe made the opening of numbered accounts subject to much closer scrutiny than before. The banks would be required, if necessary, to identify the origin of foreign funds going into numbered and other accounts. The idea was to stop such accounts being used for dubious purposes. Also, the banks agreed not to facilitate in any way capital transfers

from countries which had introduced laws to restrict the transfer of capital abroad. . Finally, they agreed not knowingly to accept funds resulting from tax evasion or from crime.

The pact represented essentially a tightening up of banking rules. Although the banks agreed to end relations with clients whose identities were unclear or who were performing improper acts, they were still not obliged to inform on a client to anyone, including the Swiss government. To some extent, the principle of secrecy had been maintained.

*By K. Lorenz*

## **THE POWER OF LANGUAGE**

When people encounter the powerful influence of language in special settings, there can arise concern and controversy. Between professionals, of course, there is no problem: whether the subject matter is medicine, science or baseball, the ability to use a special variety of language is a necessary part of professional competence. The difficulties arise only when others come into contact with it, by accident or design, and find themselves threatened by its lack of familiarity or clarity — as happens so often in such fields as science, medicine, religion, and the law. Proposed solutions are complex, and range from large-scale recommendations for reform to proposals that accept the linguistic complexity, and introduce children to these varieties while at school.

In the case of the mass media, the issues are somewhat different. Here the chief anxiety relates to the use of language to convey the truth. Whether we are faced with a newspaper editorial, a radio news report, a film documentary, or a piece of television advertising, we are confronted with the results of language selection: someone has made a decision about what shall be communicated and what withheld. Inevitably, then, questions arise about the reasoning used, and the form of its linguistic expression. Suspicion about motives is universal: 'Don't believe everything you read/hear.'

These issues vary in seriousness, depending on the subject matter, and the kind of society in which they are raised. There is an extensive everyday terminology that illustrates the many ways in which the abuse of linguistic power shows itself. At one extreme we

are faced with such 'mild' options as salesmanship, exaggeration, and sensationalism; at the other, we find a wide range of strongly pejorative labels, such as bias, prejudice, propaganda, misinformation, censorship, indoctrination, brainwashing, and psychological (which usually means linguistic) warfare. These words are being used in all kinds of social situations where people are in conflict — most commonly when the conflicts are 'organized', as in politics, religion, and trade union negotiations. However, it is impossible to agree about their meaning, as they often function only as emotional 'snarl words'.

Ironically, there is a far less extensive vocabulary available to express the various kinds of freedom and openness of expression that people aspire to. In democratic society, there are of course many kinds of activities that present freedom in action, such as public inquiries, opinion polls, and press conferences. But the concept of openness in public debate and dissemination seems not to have motivated a corresponding supply of 'purr words' for everyday use.

*"Language in the World"*

### **THE CLASH OF CIVILIZATIONS?**

Civilization identity will be increasingly important in the future, and the world will be shaped in large measure by the interactions among seven or eight major civilizations. These will include Western, Confucian, Japanese, Islamic, Hindu, Slavic-Orthodox, Latin American and possibly African civilization. The most important conflicts of the future will occur along the cultural lines separating these civilizations from one another.

Conflicts and violence will also occur between states and groups within the civilization. Such conflicts, however, are likely to be less intense and less likely to expand than conflicts between civilizations. Common membership in a civilization reduces the possibility of violence in the situations where it might otherwise occur. In 1991 and 1992 many people were alarmed by the possibility of violent conflict between Russia and Ukraine over territory, particularly Crimea, the Black Sea fleet, nuclear weapons and economic issues. If civilization is what counts, however, the likelihood of violence between Ukrainians and Russians should be low. They are two Slavic, primarily Orthodox peoples who have had close relationships with each

other for centuries. As of early 1993, despite all the reasons for conflict, the leaders of the two countries were effectively negotiating and defusing the issues between the two countries. While there has been serious fighting between Muslims and Christians elsewhere in the former Soviet Union and much tension and some fighting between Western and Orthodox Christians in the Baltic states, there has been virtually no violence between Russians and Ukrainians.

The West is now at an extraordinary peak of power in relation to other civilizations. The superpower opponent has disappeared from the map. Military conflict among Western states is unthinkable, and Western military power is unrivaled. Apart from Japan, the West faces no economic challenge. It dominates international economic institutions. Global political and security issues are effectively settled by a directorate of the United States, Britain and France, world economic issues by a directorate of the United States, Germany and Japan, all of which maintain extraordinarily close relations with each other to the exclusion of lesser and largely non-Western countries. Decisions made at the UN Security Council or in the International Monetary Fund that reflect the interests of the West are presented to the world as reflecting the desires of the world community. The very phrase "the world community" has become the euphemistic collective noun (replacing "the Free World") to give global legitimacy to actions reflecting the interests of the United States and other Western powers. Through the IMF and other international institutions, the West promotes its economic interests and imposes on other nations the economic policies it seems appropriate. Almost invariably Western leaders claim they are acting on behalf of the "world community".

The West in effect is using international institutions, military power and economic resources to run the world in ways that will maintain Western predominance, protect Western interests and promote Western political and economic values.

That at least is the way in which non-Westerners see the new world, and there is a significant element of truth in their view. Differences in power and struggles for military, economic and institutional power are thus one source of conflict between the West and other civilizations. Differences in culture, that is basic values and

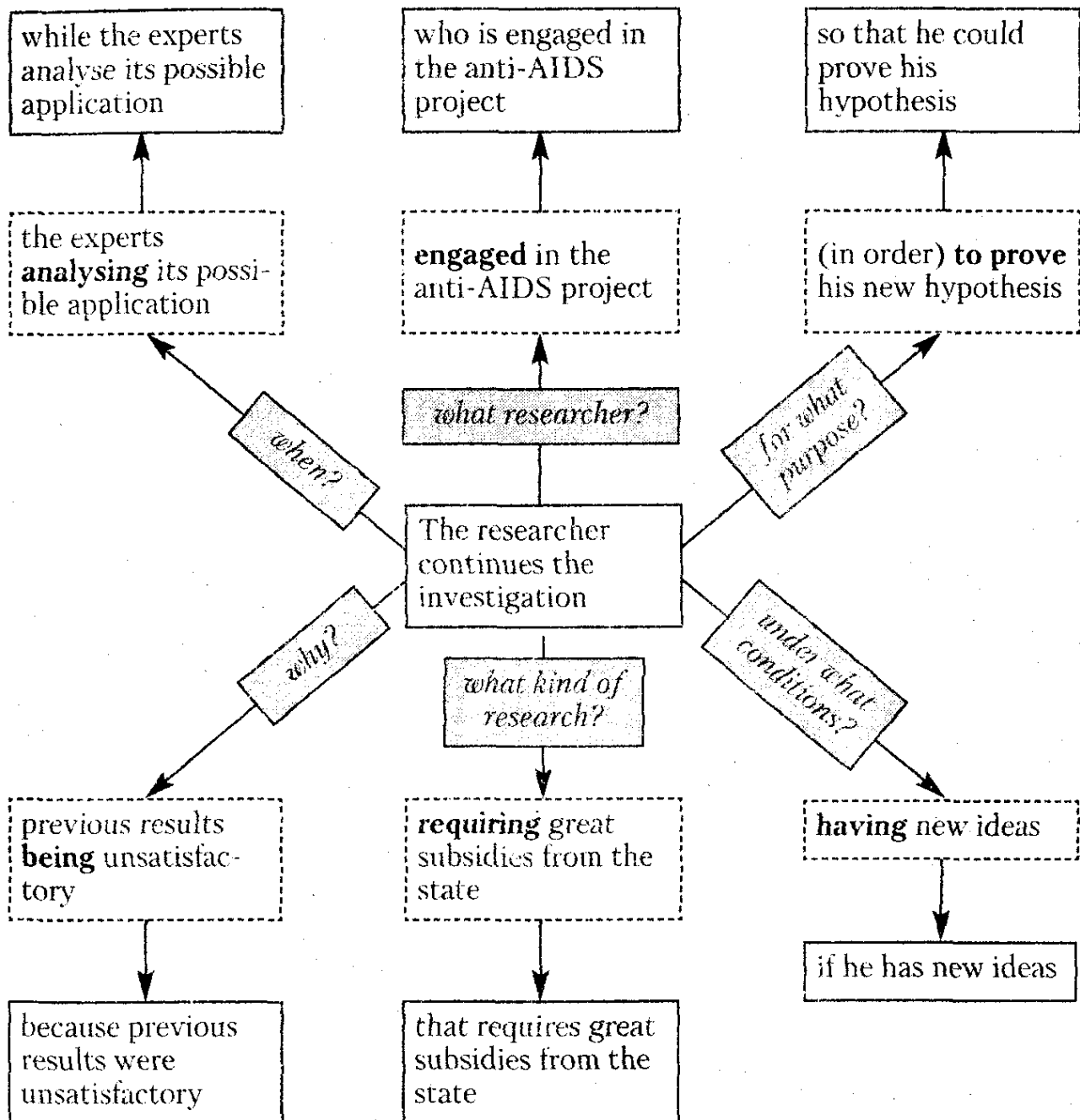


beliefs, are a second source of conflict. At a superficial level much of Western culture has indeed permeated the rest of the world. At a more basic level, however, Western concepts differ fundamentally from those prevalent in other civilizations. Western ideas of individualism, liberalism, constitutionalism, human rights, equality, liberty, the rule of law, democracy, free markets, the separation of church and state, often have little resonance in Islamic, Confucian, Hindu, Buddhist or Orthodox cultures. So the central axis of the world politics in the future is likely to be the conflict between "the West and the Rest" and the responses of non-Western civilizations to Western power and values.

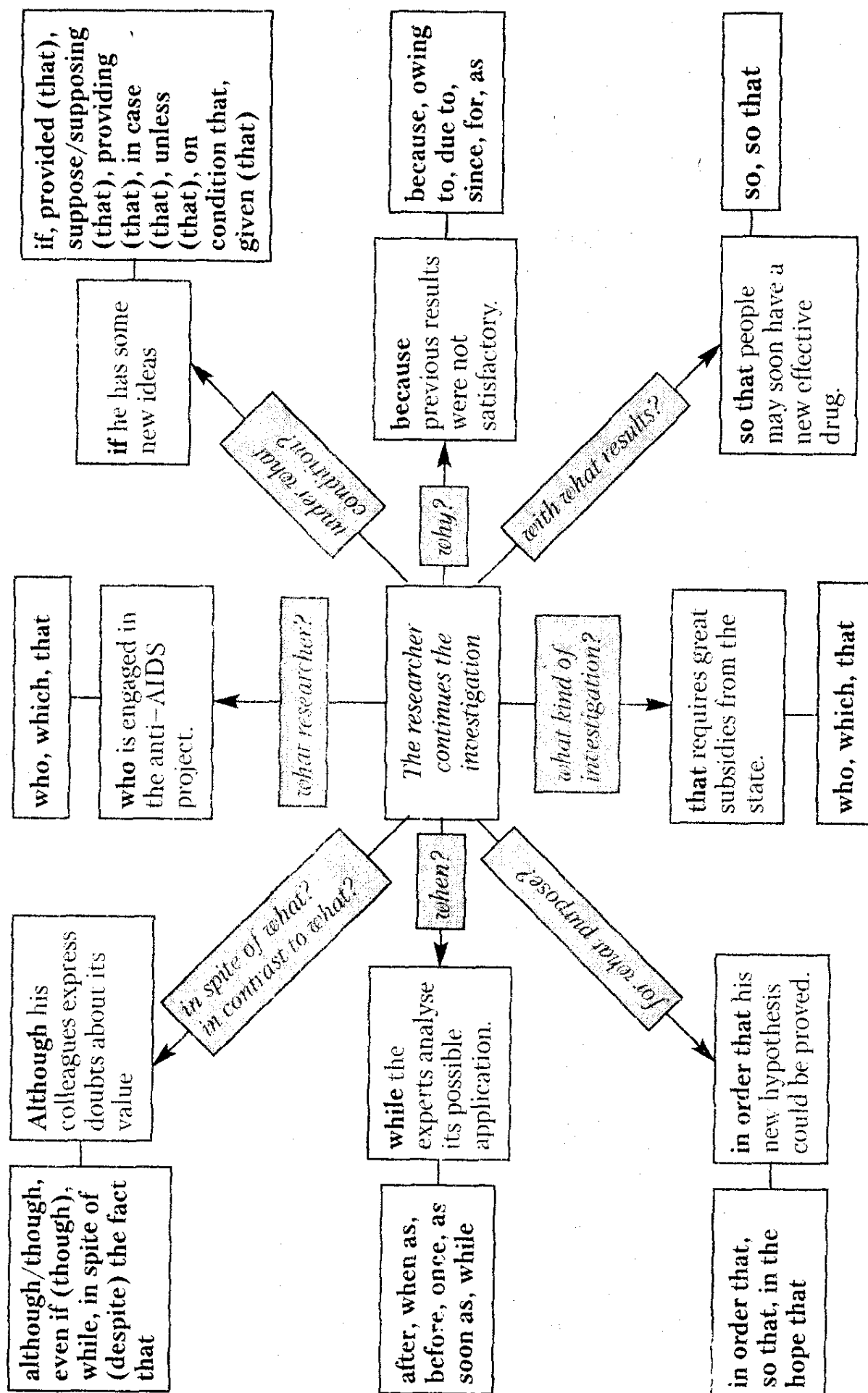
*By Samuel P. Huntington*

# ДОДАТКИ

## СХЕМА СКЛАДНОГО РЕЧЕННЯ ІЗ Ving-, Ved<sub>3</sub>-, Vinf- ЗВОРОТАМИ



# СХЕМА СКЛАДНОПІДРЯДНОГО РЕЧЕННЯ



*Навчальне видання*

**КАЛЮЖНА В. В., БУКРЄЄВА О. Й.**

## **ENGLISH OPENS MANY DOORS**

**Англійський науковий текст:  
розуміння, інтерпретація, переклад**

**Навчальний посібник**

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Складається посібник з трьох частин. Перша частина – робота над реченням – включає теоретичний матеріал (розділ 1) і тренувальні вправи (розділ 2). Друга частина – це робота з текстами. У третій частині відпрацьовуються навички складання анотації (резюме) наукової статті.

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